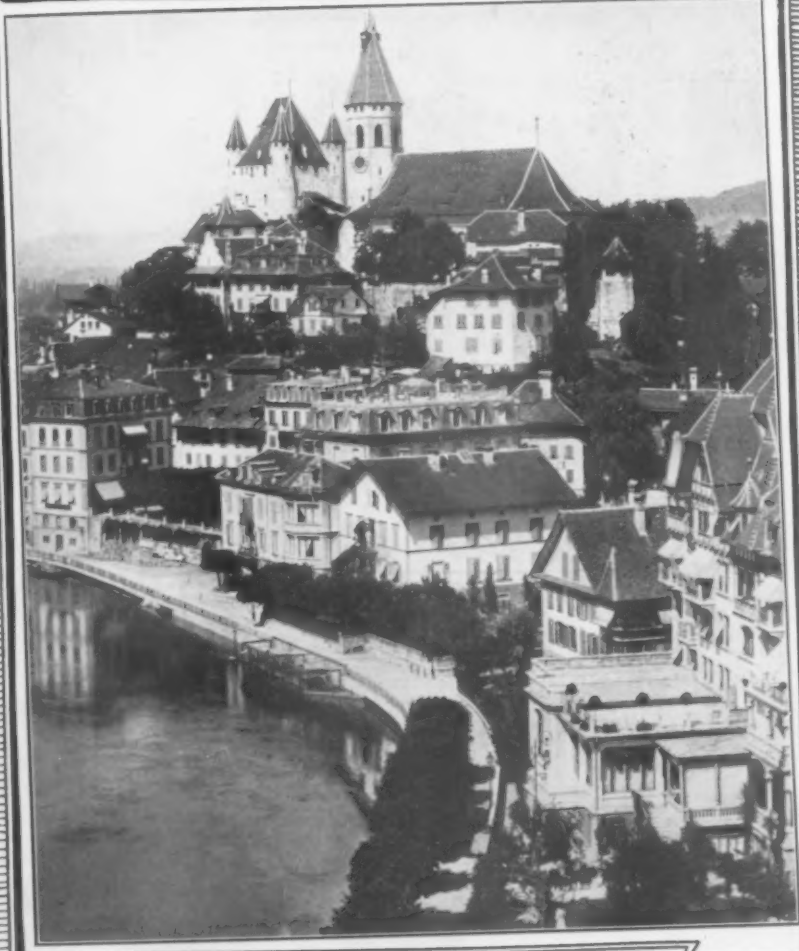
pril, 1924

APR 11 1924

C. A. E. ROOM
LIBRARY
OF MICH.

Vol. XXX No. 4
50 Cents $4 a Year

The American City

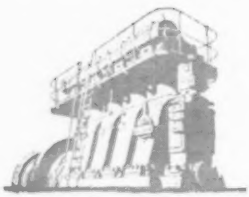


Attractive Promenades Line the River Aar as It Traverses the Picturesque Medieval City of Thun, in the Bernese Oberland, Switzerland

For Other Water-Front Views of Swiss Cities, See Pages 348 and 349 of This Issue

$0.0196 per K. W. Hour

—a saving of 40 per cent



The Abbeville Water and Light Plant at Abbeville, La., installed three Fulton-Diesels of 175 B. H. P. each in 1922.

These engines are now producing 72,000 K. W. H. per month at an average cost of $1,413.02 as against 42,000 K. W. H. with the old plant at an average cost of $1,364.12. Cost per K. W. H., $0.0196 compared with $0.0325—or a saving of 40 per cent.

These cost figures include in both cases all charges for interest, depreciation and labor, and full allowance for repairs.

This is only one of a long list of Fulton-Diesels which are converting losses into profits. They have proved reliable in all kinds of service. Not one single Fulton-Diesel horsepower has been scrapped or discarded.

The Chief Engineer and Manager of the Abbeville Plant states: "Before purchasing the Fulton-Diesel Engines we studied their construction and operating features and compared them with other engines. The satisfactory performance of the plant has justified our selection. Our dealings with the Fulton Iron Works Company have been very pleasant in every way. Since the plant was turned over they have kept in touch with us by the periodical visits of their engineers, who assist us in getting the excellent results from the equipment."

The application of Fulton-Diesel economies to your power problems is worth investigating. Anywhere and at any time, our staff of experienced Fulton-Diesel engineers will gladly consult with you, and without obligation. Executives and engineers are cordially invited to visit our plant. We have a carefully prepared, fully illustrated booklet which describes the Fulton-Diesel in detail, of which a copy will be sent you, free and postpaid, upon request.

The facts and figures related above were secured by an independent engineering organization, and are given just as furnished in their report.

FULTON IRON WORKS COMPANY, ST. LOUIS, U. S. A.

Successful engine builders for over seventy years

BRANCH OFFICES:

New York—82 Wall St.
New Orleans, La.—Hibernia Bank Building
Dallas, Texas—Praetorian Building
Havana, Cuba—401-402-403 Banco Nacional

FULTON-DIESEL

Vol. XXX No. 4 THE AMERICAN CITY, April, 1924 Price, 50 Cents; $4 a Year

Entered as second-class matter, July 29, 1910, at the Post Office at New York, N. Y., under Act of March 3, 1379

Issued Monthly by The Civic Press, 443 Fourth Ave., New York Printed in U. S. A.

Vol. XXX
No. 4

The American City Magazine

APRIL
1924

443 Fourth Ave.
NEW YORK

50 Cents
$4 a Year

Civic and Social Forces in Giant Power

"No force of nature which man has mastered can do so much as electricity to lift the burden of drudgery from the shoulders of mankind."

FORECASTING social changes as sweeping as those ushered in by the industrial revolution, the *Survey Graphic* has performed a public service of the first importance in making its March number a "Giant Power" issue. Public officials, engineers, bankers, manufacturers, labor leaders, social workers and others have here collaborated in discussing the social, civic and economic forces inherent in the coming conversion of our great primary energy resources into electricity, their regional pooling, and their integration into a nation-wide federation of systems. From this sheaf of articles, representing a year's scouting on what the editors well describe as the borderland between experience and prophecy, the following excerpts are taken.

Gifford Pinchot

Gifford Pinchot, conservationist and governor, conceives of Giant Power as a social force unshackling our people for the Great Adventure:

"As in the storybooks of our childhood, a giant—Giant Power this time—is about to do wondrous things for the human race. From the power field perhaps more than from any other quarter we can expect in the near future the most substantial aid in raising the standard of living, in eliminating the physical drudgery of life, and in winning the age-long struggle against poverty. One of the most pronounced and untoward effects of the industrial revolution with its mechanical power was the massing of population in urban centers. If, under the Giant Power dispensation, mechanical energy can not only be made cheap but distributed broadly, authorities agree in predicting spreading out of population—a veritable 'back to the land' movement."

Herbert Hoover

The medley of local clashes and Federal oversights that will be ushered in by the development of transcontinental arteries of power transmission are discussed in an interview with Herbert Hoover by William Hard. It is pointed out that the problem is one in which the Federal Government must inevitably play an important part, because of its positive power over navigable streams and its negative power over interstate agreements:

"As the immediate sovereign over all navigable territorial waters of the United States, whether those waters lie along the seacoast or extend inward into the territories of the several states of the Union, the Federal Government is obliged to undertake the responsibility of permitting or of preventing the erection of dams and of accompanying power-plants in streams to which the attribute of navigability is conceded by the facts or, at any rate, by the courts. With this responsibility there comes naturally the further responsibility of seeing to it that such dams and such accompanying power-plants are erected in harmony with the general public interest and in harmony accordingly with some reasonably comprehensive plan of ultimate complete 'Giant Power' development.

"The second Federal function here indicated springs from Article 1, Section 10, Clause 2, of the Constitution, wherein it is stated that 'no state shall, without the consent of Congress, enter into any agreement or compact with another state.' Interstate agreements, therefore,

in the matter of electric power cannot come into binding force without Federal permission; and it would seem to follow that this permission should not be granted unless the agreements in question conduce to the public welfare by being in harmony with a well-considered electric power development program."

Philip Cabot

As a banker and public utility operator, Philip Cabot visualizes high-tension electrical transmission as the "logical next step" of a privately owned public utility which has its roots in local enterprises and has the history of the railroads as a precedent and forewarning.

He projects "a structure like a system of national highways connecting the great cities in the several states, from which radiate the local roads to the farms and villages under local control." He would rigorously separate both in corporate identity and government regulation the interconnecting high-power transmission companies from the local distributing systems and central stations; put the former under Federal license to sell power to the latter and only to them; leave to the states rate and service regulation of power sold by the latter to the consumers; and thus avoid "the multiplicity of conflicting controls."

That the rapidity of Giant Power development will be dependent upon wise political action is emphasized by Mr. Cabot:

"In the point of development where we now stand the small isolated plant and the small central station have almost disappeared, being absorbed by large central stations from which alternating current at high voltage is sent out to substations 50 or 100 miles away, where the voltage is reduced to a modest pressure and all the needs of the local communities for light, heat and power are supplied. In some parts of the country current is now transmitted 200 or 300 miles. The business of these central stations and distributing systems is not as a rule interstate business. The majority of them are confined to one or two states under control of state regulating commissions which fix rates and conditions of service. Interstate commerce of this character is not now extensive, but, as the next step in advance will make it so, this feature is the most critical of all. If it be wisely dealt with, progress will be sound and rapid; if not, progress may be long delayed."

Sir Adam Beck

Ontario's remarkable experience over a fifteen-year period in uniting more than 380 municipalities in a joint investment of some $250,000,000 for the distribution of electrical energy to their citizens at unprecedentedly low rates is described by Sir Adam Beck, Chairman of the Hydro-Electric Power System of Ontario. In commenting on this article the editors say:

"When Sir Adam Beck complied with the request of the editors of *The Survey* for an authoritative statement on the work of the Hydro-Electric Power Commission of Ontario, we counted ourselves tremendously fortunate. For here is an agricultural and manufacturing region—without natural coal resources—which has developed energy from rapids and waterfalls as has no other district in the western hemisphere. Here the issue of public control and development has been removed from the realm of theory to that of practical results; to be weighed and judged thereby. Here hamlet and countryside as well as factory center have felt the stirrings of a new day; and, moreover, here the city, town, village and smaller municipality have borne the work of constructing and operating a vast hydro-electric undertaking on a cooperative basis. Sir Adam sets forth from the standpoint of the Commission how 380 such cooperating municipalities receive electric light and power 'at cost' and own or are constructing

A Challenge to Human Engineering

The importance to city planners, municipal officials and civic workers of the new force inherent in Giant Power is too little realized. As Robert W. Bruère well says:

"The human engineers have worked out no large plans for the distribution of population and the spiritual enrichment of community life comparable to those which the mechanical engineers have developed for the production and distribution of mechanical energy. They have been content to be camp followers rather than patriots in their own right, Red Cross workers to the captains of industry rather than co-equals in community building.

"Through the development of the electrical industry the mechanical engineers are reconstructing the material foundations of America; the human engineers are hardly aware that a new technical revolution is on. And the few that are rest under the romantic illusion that large-scale electrical development means only the harnessing of our streams; they have yet to realize that for the greater part of industrial America, giant electrical power must be coal power."

plants capable of an aggregate development of a million horse-power."

Samuel Gompers

Labor's vision of the possibilities of forethought in Giant Power development is set forth by the veteran President of the American Federation of Labor, Samuel Gompers:

"We are in the fortunate position of having one great industrial development so shaping itself that we may be in advance cognizant of its coming and in a position to take intelligent action in regard to its development. We, as a people, shall be foolish indeed, if this tremendous development is allowed to roll its great weight upon us without any action on our part looking toward its control and direction. We have before us an opportunity to take one great engine and compel its course so that it shall be to the largest possible extent a well-balanced social asset, instead of an engine run primarily for profit and only secondarily for service.

"Surely human intelligence is capable of something better than the railroad muddle in the development of power. Surely it is capable of something better than the muddling of the mining industry. There has yet grown up no fixed tradition in Giant Power. There is no dead hand upon the project. There is here the opportunity for control that will function for the good of the industry itself and for the good of industrial life in general. There is every reason why there should be erected for the coming power industry a democratic organization for the operation of that industry."

Morris L. Cooke

That consumer's rates for electric current —especially for small users—are of the essence of any discussion of Giant Power and its possibilities, is the opinion of Morris Llewellyn Cooke, Director of Pennsylvania's Giant Power Survey:

"We believe that electrical technology has advanced to a point where the use of current can be made so inexpensive as to revitalize the whole social fabric. The willingness of the private agencies occupying the field to meet proper social requirements will be assumed.

"Present rate schedules bear heavily on the small user—especially on the householder—as contrasted with the large industrial user. The spread appears to be too great between the classic rates now charged for domestic use—15 cents per kilowatt-hour in rural districts and 10 cents in most urban districts except the largest—and the rates charged the largest industrial users—one cent and sometimes below that figure. These typical American spreads between high and low prices, frequently 20 to 1, are very much greater than those encountered in other countries. No such range in price is encountered in the rate schedules of our relatively few publicly owned electrical enterprises, such as those of Cleveland, Ohio; Los Angeles, Calif., and Seattle, Wash. Rate increases, quite general since 1914, have been applied almost exclusively to current used for industrial and commercial purposes and therefore have tended to reduce this discrimination. Because of the unnecessarily high rates for home use, we have not begun to see that wide-spread electrical development in the domestic field which will follow when rates are freed from this type of discrimination.

"The student of electric rates will be surprised at their complexity and especially at the lack of uniformity in the tariffs of companies doing a comparable business. These and other aspects of the current system of electric rates will require study and standardization as essential features of any Giant Power program.

"The electric industry was never more alive than it is to-day. It is probably as free from retarding tradition as any industry, and it is attracting to its service a personnel highly educated along technical lines. While it is becoming more and more subject to the inertia that goes with the unification of policy over wide areas, the incentives for experimentation and fluidity of practice are greater to-day than ever. On the adjustments of these opposing forces of inertia and progress the future of the industry appears to depend. The degree to which social vision is used in adjusting this conflict will largely determine the outcome of the decision as to public versus private ownership."

Benefits from Tax-Exemption of New Housing

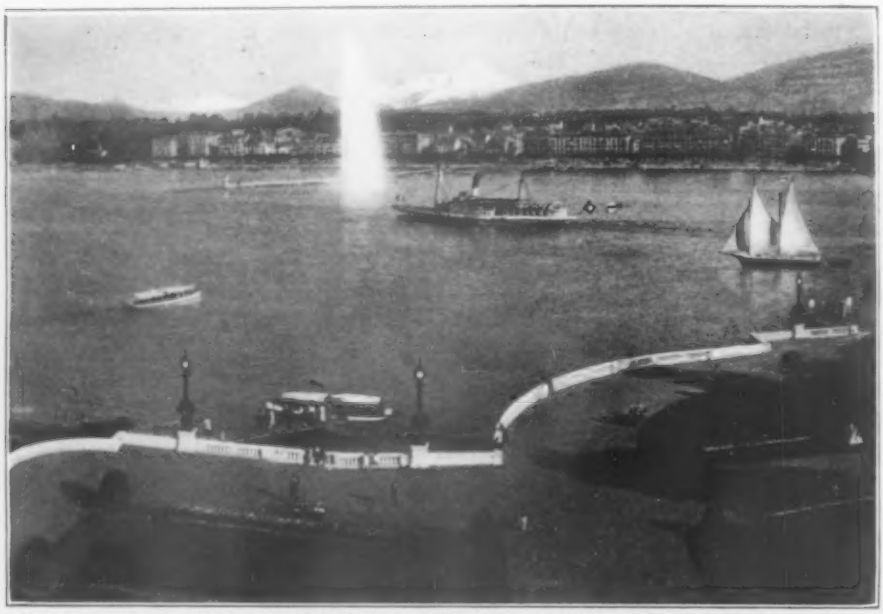
THAT partial tax exemption of new housing is creating in New York City aggregate taxable values to an extent heretofore unknown in the history of any municipality, is the opinion of the Commission of Housing and Regional Planning of the State of New York, as expressed in a report made on March 14 to the Governor and Legislature. In stating this, the Commissions says:

"From the increased taxable value of the land the city is already drawing benefits in larger taxes. From the tremendous increase of taxable values in improvements, the city will derive benefit in a few years. The immediate outlay which the city will have to make in added requirements for fire and police protection, for schools, for sewers and other services is relatively small. In the future the city will be repaid for any immediate outlay."

Among other benefits stated by the Commission are that tax exemption was the principal factor in breaking the deadlock in housing construction in 1921; that it has served as an incentive to the building of large numbers of houses of moderate cost, and that by reducing the annual payment required in the purchase of a house, construction for home ownership has been greatly stimulated.

Lake Promenades and River Banks of Swiss Cities

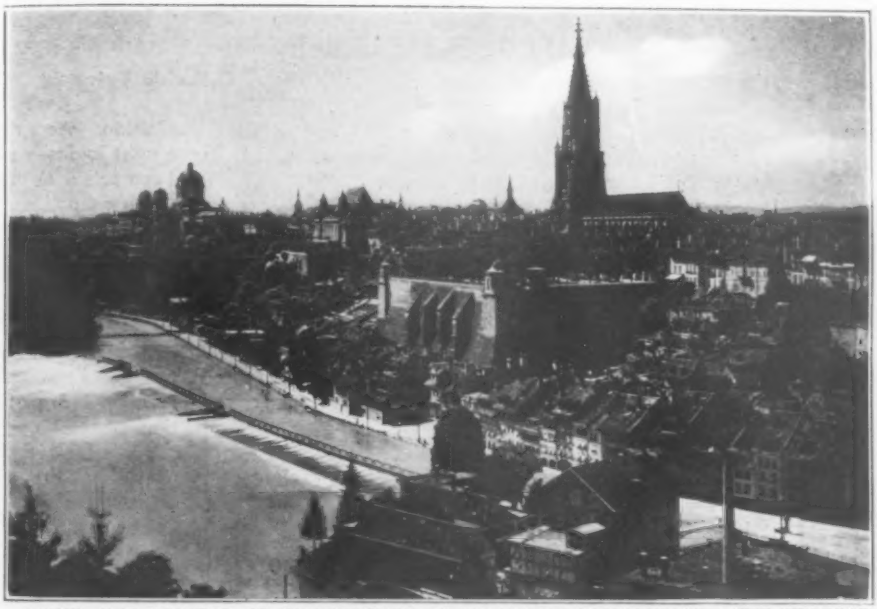
(For these four views and the one shown on the front cover of this issue, THE AMERICAN CITY is indebted to the New York Office of the Swiss Federal Railroads)



THE HARBOR OF GENEVA, SWITZERLAND, PRESENTS A SPECIALLY ATTRACTIVE PICTURE IN SUMMER WITH ITS FAMOUS BREAKWATER (JETEE), ON WHICH A FOUNTAIN WITH A JET 295 FEET HIGH PLAYS ON SUNDAYS AND HOLIDAYS

BEAUTIFUL MONTREUX ON THE LAKE OF GENEVA, WITH THE DENT DU MIDI IN THE BACKGROUND

Swiss cities and resorts maintain Official Inquiry Offices, part of whose function is to help develop and beautify their locality in accordance with modern requirements. Hotels, stores and other business concerns support these so-called Verkehrs-und Verschönerungsvereine, or Sociétés de Développement, by yearly contributions, the municipality helping out with the rest.



BERNE, THE CAPITAL OF SWITZERLAND. THE GOTHIC MUNSTER AND THE FEDERAL PALACE WITH ITS CUPOLAS ARE WELL IN EVIDENCE. THE PHOTOGRAPH SHOWS WATER BEING DIVERTED FROM THE RIVER AAR FOR POWER PURPOSES

BRIDGE LEADING TO THE ZURICH RAILROAD STATION. THE SWISS NATIONAL MUSEUM IS SEEN AT THE RIGHT, NEXT THE STATION

Who Shall Determine the Amount of the City School Budget?

By J. R. McGaughy

Assistant Professor of Education, Teachers College, Columbia University

THE typical American city is expending upon its public school system between 35 and 40 per cent of its total receipts from local taxation. In practically every city the expenditure of this money is in the hands of a board of education which is held responsible for the relative success or failure of the system of public schools in that city. There has been a great deal of controversy as to whether or not this board of education shall itself determine the amount of its annual budget. Boards of education which are free to decide the total amount of money which shall be expended upon the schools each year, subject only to legal limitations imposed by state law or their own city charter, are known as independent boards. Those boards of education whose annual estimates of expenditure may be revised and reduced by some municipal authority, such as the mayor or a board of estimate, are known as dependent boards.

Two Groups of Cities Compared

The conclusions here presented as to the fiscal and educational results secured by independent and dependent boards of education, are based on data recently secured by the writer from 377 cities. The two groups of cities were compared on the basis of their expenditures for school purposes and of the distribution of those expenditures among the various functions of a school system; on the basis of their practice in financing public education, and on the basis of certain educational results achieved.

There are several American cities whose boards of education are not independent, as the term is here defined, nor are they dependent upon *municipal* control of the amount of their annual budgets. The annual estimates of these boards are subject to reduction by some county or state authority, or must be passed upon in a "town meeting." In the study which is to be reported in this article such boards of education have been classified as special boards.

A majority of the specialists in municipal administration have been insistent that the amount of the school budget should be dependent upon municipal control. They conceive of public education as a department of the municipal organization. Accepting this premise, they argue most logically that the public schools should compete with other municipal departments, such as police and public works, for a share of the limited amount of revenue available for carrying on all governmental functions. They insist that some central municipal authority should be responsible for the apportionment of this total amount among the various departments of the municipal organization.

Almost without exception, the specialists in public school administration take a very different stand as to proper municipal organization. The courts have repeatedly ruled that public education is a state function. Even though the state may legally delegate its responsibility to individual cities, educational authorities argue that such delegation of authority is most unwise, that it makes the city school system a football of politics, and that sound theory demands that the people of each unit of the state choose a board of education which shall be directly and solely responsible to them in the administration of their public school system. They contend, further, that a board of education is primarily an agency for determining school policies, and that a city government really supplants the board in its primary function if it be given the power, through control of school funds, to decide whether a given school policy shall be put into effect.

With these two conflicting theories of municipal organization widely held and ably defended, it is not surprising to find great variation in practice in determining the

amount of the annual school budget in American cities.* In approximately half of the cities of over 8,000 population in 1920 the boards of education are fiscally independent, one-fourth are dependent upon municipal control, and the other one-fourth fall in the special group. They range all the way from cities like St. Louis, whose boards are completely free to determine their school budgets, to certain Eastern cities, such as Baltimore, whose school budgets must be passed upon, and may be reduced, by three or more different municipal authorities.

Until very recently there has been no fact basis for determining whether there were significant differences in the fiscal and educational results secured by independent and dependent boards of education. The whole controversy between the opposing camps of specialists was of necessity carried on in a welter of conflicting guesses and opinions.

The writer has recently completed a study of fiscal independence of boards of education based on complete data secured from 377 cities of more than 8,000 population in 1920.† The outstanding findings of this study are here reported. The conclusions presented are based upon a comparison of the averages for independent boards and for boards dependent upon municipal control. The statistical technique for determining the reliability of the difference between two averages was used. A difference between the two groups of cities is reported as real or significant only on condition that the chances are less than one to forty-six that this difference would disappear or be reversed if absolutely accurate data were available for every city properly belonging in either group. The application of so rigid a test of reliability insures the highest degree of validity for all conclusions here presented.

The most important fact which is proved by this study is that fiscal independence has not resulted in increased expenditures for schools. The average total expenditure per pupil in attendance in independent cities was $83.28; in the dependent cities it was $84.29. The statistical technique used shows that this difference of one dollar per pupil is not significant and does not justify the conclusion that total expenditures are higher in cities whose school budgets are determined by municipal authority. This lack of difference in total school expenditure is a conclusive answer to those who have feared that fiscal independence would lead to extravagance. Most clearly an adverse decision concerning fiscal independence may not be justified on the ground that it would result in heavier expenditure for school purposes.

Although cities having independent and dependent boards of education spend the same amount per pupil, on the average, there are marked differences in the proportion of this total which they devote to the various functions of expenditure. Independent cities spend larger amounts per pupil on general administration and on all those functions which have to do with the maintenance and adequacy of school buildings and playgrounds. Dependent cities, on the other hand, spend larger amounts per pupil for the salaries of teachers, supervisors and principals. It is not surprising, perhaps, that a city government whose continuance in power is dependent upon the number of votes which it can muster, should encourage the spending of money most freely in salaries for personal service, and should tend to neglect school buildings and playgrounds.

Cities with dependent boards of education are much more inclined to incur bonded indebtedness for all municipal purposes, but independent cities have higher tax rates for school purposes. The two groups of cities expend the same amount per pupil for school purposes and raise the same proportion of their total receipts through local taxes. All of these facts taken together indicate that dependent cities tend to incur long-term indebtedness and thus pass on part of their financial burden to the next generation, while independent cities tend to pay as they go, to a much greater degree. Another essential difference in the financial practice of the two types of boards of education is shown in their reaction to the emergency occasioned by the rapid increase in the cost of living during the recent war: independent boards increased teachers' salaries more nearly in proportion to the in-

*For a complete discussion of this variation among cities see Frasier, G. W., "The Control of City School Finances," Bruce Publishing Company, Milwaukee, 1922.

† McGaughy, J. R., "The Fiscal Administration of City School Systems," published as a bulletin of the Educational Finance Inquiry Commission, Macmillan, 1924.

creased cost of living during the six years preceding 1919-20 than did the dependent boards of education, the salaries paid by the independent boards having been even lower proportionately prior to the war than at present.

Certain differences in the educational results secured by the two types of boards were also discovered. Cities with independent boards are more successful in keeping their sixteen- and seventeen-year-old children in school, provide a greater amount of playground space per pupil, and have a greater percentage of their pupils in school on full-time schedules. A smaller percentage of their pupils are housed in basements, corridors, attics and portable buildings. On the other hand, cities with dependent boards of education have a greater percentage of women elementary teachers who have had six years or more of training above the eighth grade. This fact is probably a direct result of the higher salaries paid to teachers in these cities.

Specialists in educational administration agree that the most efficient boards of education are made up of a small number of members each of whom is elected from the city at large on a non-partisan ballot for a comparatively long term. Dependent boards of education have a greater number of members, their members are chosen for shorter terms, and a much smaller percentage of them are elected at large on a non-partisan ballot.

The facts here presented constitute the available evidence to be taken into consideration in answering the question, "Who shall determine the amount of the city school budget?" If the board of education is made dependent upon some municipal authority which shall determine how much may be expended each year on the city school system, it seems fair to forecast that teachers' salaries will be higher, that the teachers employed will have more years of professional training and that the school tax rate will be lower. If the board of education is given independence from municipal control of its annual budget, it seems equally fair to predict that less bonded indebtedness will be incurred, that more adequate school buildings and playgrounds will be provided, that more children will remain in school after the age of compulsory attendance has been passed, and that the public schools will be more successful in meeting economic emergencies which may occur.

The answer to this question will in no way affect the total amount of money which will be expended for public school purposes.

Public Recreation Referenda in Illinois and Iowa

THE most intensive effort to promote public recreation undertaken in a limited area of the country in recent years is on in Illinois and Iowa. Within the year about 35 cities of less than 150,000 population plan to put to vote the question of establishing public recreation systems. The Playground and Recreation Association of America, with headquarters at 315 Fourth Avenue, New York, has sent a number of its best field workers to assist in the educational work.

Amendments to the state recreation laws passed at the last sessions of the Illinois and Iowa Legislatures have been responsible for this wide-spread interest of cities in providing recreation centers and recreation leaders. The amendments have made the laws many times more practical and effective. They make it possible for cities to use existing land and building facilities for the establishing of recreation centers, or to lease such facilities at a nominal sum. It is no longer necessary to purchase special properties for playgrounds and recreation centers.

In Illinois the cities have been given power to levy a special tax not to exceed 1 1-3 mills for the establishing and maintenance of a playground and recreation system. This tax, once voted, is available year after year unless revoked or changed by a majority vote of the people. In Iowa, tax funds up to 2 mills have been made available for use in maintaining recreation grounds, including the employment of workers.

Of particular interest are the initiative features of the new laws. They provide that upon petition of a small percentage of the qualified voters (10 per cent in Illinois and 15 per cent in Iowa), a town or city must submit the playground and recreation proposition to vote at the next general election or at a special election. In Iowa the proposition may also be submitted on vote of the city council, so it will not in many cases be necessary to get up a petition.

Chambers of commerce, organized labor, the churches, the women's clubs, agricultural associations and other important organizations in both states are backing the campaign. Local juvenile courts and reformatories are testifying to the value of directed play in decreasing child crime.

The Design of Swimming Pools as to Operation and Sanitation

By Jack J. Hinman, Jr.

Associate Professor of Sanitation, University of Iowa; and Chief, Water Laboratory Division, Iowa State Board of Health, Iowa City

MOST of the work of designing swimming pools has fallen to the local city engineer, the local architect, or to some other person who might be expected to be familiar with the general type of construction into which tanks fall. Frequently the person selected tries to get information about the design of pools from the engineering papers or from trade literature, and he finds some material there. Unfortunately, a goodly part of the material that he will find in the magazines available is not good material—at least it is not good material from the standpoint of operation and sanitation.

The data to be found in these papers concern chiefly the excavation, the reinforcement, the expansion joints, and the concrete shell. In other words, the articles are about the very parts of the work with which the engineer is most familiar, and on which the competent man is not so very likely to go wrong. But the swimming pool is something more than just a tank. It is not just a place to store a lot of water. It is a place designed for a very special use, whether it be an indoor natatorium or an outdoor one.

The purpose of this paper is to explain why the ordinary tank is not a satisfactory swimming pool, and to mention some of the features which should be taken into account in the design of this type of equipment.

Drainage and Dimensions

To begin with, we will admit that the basin should be tight, that it should be designed with the expectation that the temperature in indoor pools will range from a winter temperature to at least 85 degrees Fahrenheit, and that the walls should be designed so that the basin may stand full or empty with ample safety. The pool should drain completely and reasonably quickly, without the backing up of water in the sewers.

The minimum length of pool in which athletic records may be made is 60 feet; therefore this is the minimum length, except under unusual conditions. Five-foot swimming lanes are required, and, therefore, it is a good idea to design the width of the pool so that it is in multiples of 5 feet.

The most satisfactory depth range is from about 3 to 7½, 8 or 9 feet. Where young children in any number are to be among the patrons, the 3-foot depth may with reason be lowered to 6 inches, or even to zero. There is no necessity for a great area of deep water. To be sure, there should be deep water at the points where divers will enter the water, but there is no need for water over 4½ to 5 feet deep for the rest of the swimming. Indeed, the greatest fault with most of the pools in use to-day is that they have too much deep water. This is particularly true of the large outdoor pools.

Deep water means increased water capacity. That means uneconomical design, for the water must be paid for, and in many cases it must also be heated. More important than this, deep water restricts the use of the pool. Most people who use a public pool are not able to swim well; at most, they paddle around a little. Many never take their feet off the bottom. If there is a large area of deep water, these people, who constitute the bulk of the patronage, are herded together in the shallow end of the pool, where they are subject to less sanitary conditions than if they had more space.

About 90 per cent of the area of a large public pool should be shallow area; that is, the water should be 5 feet deep or less. In a small pool, nearly the same area of deep water as in the larger ones is necessary for the divers. However, an area of deep water across one end of the pool and about 10 to 15 feet wide ought to be ample. Where spring-boards or towers are used, the deepest point should be below the place where divers from the tower or spring-board will enter the water.

College pools and others that are to be used for contests, meets, etc., may with reason have a larger proportion of deeper water, but since most of these pools also are used for swimming classes, the deep-water area should not be a great deal more extensive.

The deep end of the pool should be the end away from the entrance to the enclosure or pool room. The dressing-rooms and baths should be located at or near the entrance. This arrangement will tend to keep poorly qualified persons from getting in the way of divers, and will lessen the danger of accidents through such interference, and also through non-swimmers falling or being pushed into the deep water. The scheme of putting the deep-water area in the center of a large pool has much to recommend it. It may be assumed that only the strong swimmers will get out to the diving platform and tower in the center of the pool. Occasionally, some swimmer will reach the platform after a fatiguing effort and will be afraid to attempt the return trip, but, of course, life-guards should be on the raft or platform and would help the swimmer back to safety, if requested.

Importance of Scum Gutters

The second error of construction, in point of frequency, is the failure to provide scum gutters entirely surrounding the pool. Some of the companies that get out pool literature apparently overlook this essential feature, and advise merely surrounding the basin with a pipe life-rail. A life-rail of some sort is essential to the safety of the individual bather, but it is better to use a combined scum gutter and life-rail than a mere pipe. The common commercial types of scum gutters are cast so that the lip of the water channel fits the hand and provides an excellent hand-hold, while the channel itself forms an expectoration and overflow trough, and a passage through which all surface wastes and dust may be carried away to the sewer.

Dust and collections of floating matter in many cases may be flushed away merely by raising the water-level and letting the overflow carry it into the scum gutter and so on to the sewer. This floating matter is unsightly and difficult to remove when a gutter is not provided around the whole pool. I have seen outdoor pools where it was necessary to attempt to bail out the dust, dead frogs, grass that had blown into the pool, and similar débris, by the use of a bucket. It was a time-consuming and imperfectly successful job. Yet in one of our foremost engineering journals the designer of that pool recently described the overflows as being ample and gave them the chief credit for keeping the pool in a satisfactory state, with only secondary mention of the chlorination boat—the thing that actually did the work. Much of the material discharged from the noses and throats of the patrons of the pool will float, and will collect at the point where the dust gathers. The sooner such material goes down the sewer, the better, for it is potentially very dangerous. Most pool operators try to see to it that the bathers spit into the scum gutter, where there is one. Others simply say, "Do not spit in the pool." But the man who is in the middle of the pool must spit somewhere when he takes aboard too much water, and he can't take the time to come clear over to the edge in such an emergency. When a scum gutter is provided, however, the bathers will use it as much as they can, and every bit of dangerous matter that can be kept out of the pool water should be kept out, by all means. Of course, the scum gutters should drain quickly and completely.

The Runway

The next thing to be spoken about is the runway. Many of these are entirely too narrow; many of them are made of material that becomes very slippery when wet or that is not easily kept clean. The greatest trouble comes from the way that the runways are pitched to drain. They ought, of course, to drain away from the pool sharply enough so that a bead will not need to be put on the pool edging. A serious error is made if the drainage from the runways is led to openings that carry it down into the scum gutter and subject it to the danger of being carried out into the pool. The runway drainage carries much dirt and a lot of very objectionable bacteria, and it also ought to reach the sewer as soon as possible.

Personally, I like to see a raised edge about a foot wide and about 6 or 8 inches high all around the pool. This definitely separates the runways from the pool, prevents drainage of all sorts from getting in, and allows scrubbing and flushing of the runways without any possibility of the wash water's being carried over the edge.

THE SWIMMER CANNOT GET A GOOD START IN A RACE WHEN THE EDGE OF THE POOL IS BEADED

On account of the possibility of tripping over the raised portion, it should be lined or marked so that this raised edge will be quickly noticed.

Beads on the edge of the pool make it hard for swimmers to get a suitable start in races, since the foot must be tilted so that the toes are raised. A square corner rounded at the edge, with a curve of short radius, is the best type of edge from the swimmer's standpoint.

Housing of Indoor Pools

The height of the room in which an indoor pool is placed is an important matter. The old type of dark basement pools is passing out of existence. They were neither attractive nor easily taken care of. Nowadays the greater number of pools are housed in large rooms with plenty of window space or with skylights to supply illumination during the day. The fact that the air of pool rooms is saturated with moisture calls for special water-proof finishes and the elimination of iron fixtures as far as possible. The iron fittings rust and cause stains on any light-colored substance over which flows any water that has condensed on, or come into contact with, iron.

Ventilation by windows alone is unsatisfactory. During cold weather, the cold air from the outside blowing into the room causes clouds of condensed water to form. This is objectionable from its effect on the fixtures and on the comfort of the bathers. Cleaned air warmed in winter and provided by a series of ventilating ducts is preferable.

The height of the pool room should be at least great enough so that divers from the spring-board are not endangered. About 12 to 15 feet is needed between the top of the board and the ceiling.

Keep Spectators from the Runways

When spectators are allowed to move about on the runways where the swimmers are, there is bound to be more or less tracking of undesirable dirt into the enclosure, and the consequent carrying of the dirt into the pool on the wet feet of the bathers. Visitors' galleries, grand stands and simi-

METHOD OF SURMOUNTING THE DISADVANTAGE OF BEADING ON THE EDGE OF A POOL

lar places should be provided and definitely separated from the swimmers' enclosure.

Every one realizes, I suppose, that the lining of the pool should be of the smoothest, most impervious material that can be secured for the money available. The lining should also be as white as possible. A white, smooth surface is most easily kept clean, and by reason of its apparent cleanliness is most attractive.

Swimmers' Lanes and Other Lines

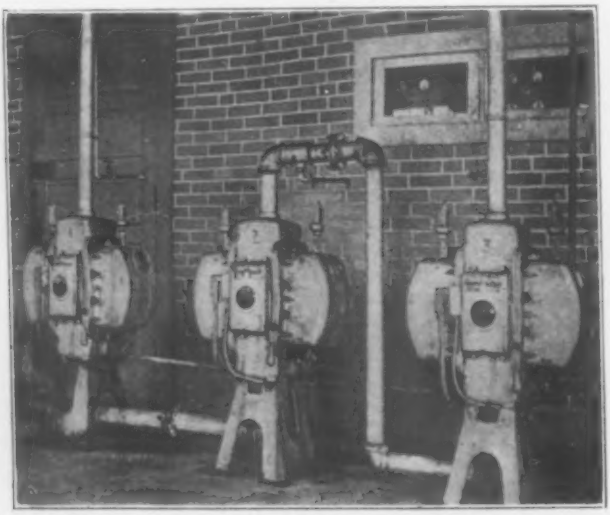
It is desirable to mark the walls and the bottom of the tank with dark lines adapted to the use to which the pool will be put. In tile-lined tanks, the dark lines may be of dark green or black tile. In general, the lines that are most desirable are swimmers'-lane lines. These lines should start well above the water's edge and be continued without break for the entire length of the tank and up to the corresponding height at the other end. Using these lines, the swimmer can keep within his lane, whether he keeps his head above the water or swims face downward with his eyes open under water. Additional lines for water basket-ball and water-polo, and the line on the tank showing the jack-knife limit, 6 feet from the end of the spring-board, are desirable.

It is desirable, also, when possible, to show the distance from one end of the pool to the other. This may be done by placing a small mark at every foot, with every fifth or every tenth foot numbered. These marks are useful in watching the plunge for distance, and are helpful at other times. Signs about the pool showing the depth at definite points are well worth while, as they may prevent persons from diving into shallow water, or from going in beyond their depth.

Filtration and Chlorination

If the tank is kept filled with clear, colorless water, the floor of a white-bottomed pool should be very easily seen. This is exceedingly advantageous. It enables the life-guards to keep a more efficient watch on the bathers and prevents the accidents which may result by a swimmer's sinking and the fact's not being noticed until too late. Of course, a thing like that is not very likely to happen when the pool is not crowded, but when the pool is crowded, the life-guards have their hands full to keep order and to watch the swimmers who are in plain view.

Continuous recirculation and refiltration are desirable for the purpose of keeping a pool water clear and in suitable condition from the standpoint of appearance, as well as in a sanitary state. Filtration alone is not regarded as ample protection, however. The heating and aeration that pool waters get causes a large part of the gases in the water to escape. Some of the calcium bicarbonate breaks up, the normal carbonate precipitates, and then we have a whitish turbidity, due to the precipitate. This condition is one which is most usually found in the indoor pool where a hard water must be heated. The calcium carbonate has a bad way of cementing the sand grains of the filter and so rendering the filtration less satisfactory.



ULTRA-VIOLET RAY APPARATUS, UNIVERSITY OF IOWA

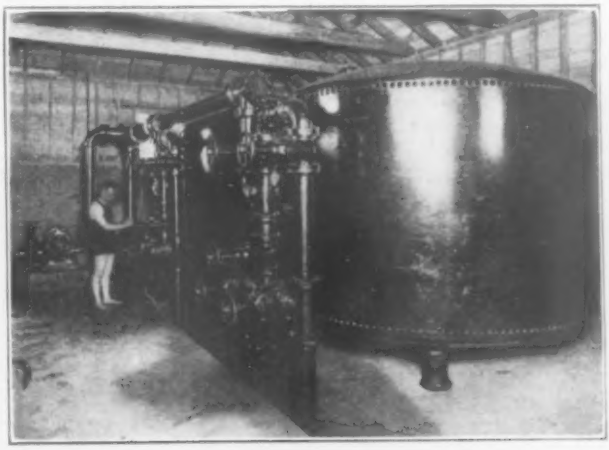
It can be shown that refiltration and recirculation of pool water are desirable from an economic consideration. They allow waters to be used for a much longer period of time and so save in the

"W & T" CHLORO-BOAT STERILIZING THE POTOMAC TIDAL BASIN, WASHINGTON, D. C.

first cost of the water and in the heat necessary to bring the pool of water to a usable temperature; and besides this, they lower the turbidity, and keep it down, in spite of the tendency for the carbonate decomposition to make the water turbid after use. Filtration removes bacteria, but not to a sufficient degree as ordinarily practiced. It must be supplemented by some other means. This means the use of some germicidal agent.

The common germicidal agents are copper sulphate, chlorine (either as the liquified gas, or as the hypochlorite of calcium or sodium), the ultra-violet rays, or ozone. With the last named process I have had no experience. I am conducting some experiments on the ultra-violet rays at the present time. My experience with the use of chlorine has been successful, although the chemical has to be handled with discretion, and persons are apt to claim that they can detect the odor of the chemical when it has not yet been used. Personally, I prefer the liquefied chlorine as being susceptible of more accurate and more workmanlike control. It is more expensive to install and operate apparatus for gas under pressure, but the gas does not deteriorate on storage as the hypochlorite does, and the apparatus, which must be handled with care, will stand up well if given a chance. Copper sulphate has some germicidal powers, but is most useful in keeping down the growths of algae or water scums which frequently bother the operators of open-air installations.

It is important to remember that while well-recognized methods of treatment help greatly in maintaining clean swimming-pool water, they do not in themselves insure a safe condition. The equipment must be properly and continuously operated and the supervision of the pool and bathers must be constant and careful.



Water for the Community Swimming Pool, Aurora, Ill., is passed through the Graver recirculating and refiltering system, where it is filtered and sterilized to remove suspended matter and bacteria. This system has two vertical pressure filters each 12 feet in diameter by 10 feet high, using a filtering medium consisting of two layers of crushed quartz above two layers of graduated sized gravel. These filters have a capacity of 29,260 gallons per hour, based on a rate of 3 gallons per square foot of filtering surface per minute; one alum pot for introducing alum into the water; one Wallace and Tiernan chlorinator; and one centrifugal American Well Works pump, having a capacity of 28,500 gallons per hour

Removing Deposits from the Tank Bottom

A certain amount of dirt, lint, hair, etc., will settle to the bottom of the tank after a time. Although this material is very offensive in appearance, and looks very black, it is only a very thin layer of fine, powdery deposit. It is not readily drawn toward the outlet during recirculation, and when an attempt is made to sweep it toward the outlet by means of weighted brooms, it rises into the water and dissipates, only to fall down again when the currents have subsided. Then it looks just as bad as ever.

This dirty deposit may be removed with a sort of vacuum cleaner arrangement especially designed for such work. The water which is removed by the tool from near the bottom of the pool may be deposited either upon the top of the filter and the deposit strained out, or run into the scum gutter and the water and dust run together to the sewer. Whenever a new pool is constructed, some arrangement should be made to take care of these dirty-looking sediments. In an indoor pool with white tile lining, the dirt is very likely to make swimming in the pool unattractive, and its removal is quite a bit more important than in the outdoor pool, where it is not so noticeable.

Water Dilution and Pool Safety

From the standpoint of sanitation, the material in the pool which is most likely to cause disease consists of the fresh secretions newly thrown off from the bodies of bathers. Some of the organisms that we fear the most are very delicate and highly specialized. They do not adapt themselves well to unfavorable conditions. Lower temperature and less abundant food than they find in the body constitute such unfavorable conditions. Among these fragile organisms are most of those that cause infections of the respiratory tract. The organisms that cause intestinal diseases, such as typhoid, are more resistant—though they, too, soon succumb in the fight for life against stronger organisms which they encounter in the pool. The common soil and water bacteria find conditions much more to their liking and they are stronger than the pathogenic forms.

As a result of this, the man who is in the pool with you is a more real danger to you than the man who was in the pool yesterday. To make the pool safe, there should be a rapid dilution of infective material and a correspondingly rapid carrying away of the dangerous substances toward the exit pipes. Any type of inlet and outlet that will accomplish this rapid dilution and allow the minimum dead water areas will be satisfactory.

But a word of caution is needed in regard to pool safety. Do all you can to make the pool safe; keep everything as clean as you can; still you are very likely to hear of ear and eye trouble among the users of the pool. A good deal of this is auto-infection. The bathers are carrying the causative organisms on their own body surfaces, and when the maceration of the skin has reduced its resistance to the invading bacteria, they may enter and cause trouble. Rigid inspection of bathers is helpful, but it will not entirely remove this condition.

The maximum safety from dangers incident to unsanitary conditions must be given, but attractiveness, comfort and convenience are important, also. Hence, consideration should be given to toilets, locker-rooms, dressing cabinets and showers. They, and the arrangements for handling the towels and suits, need careful planning.

Toilets and Shower-Baths

In order to avoid any possibility of the swimmers' voiding body wastes into the pool, adequate toilets should be provided and kept in such perfect sanitary shape that they will not leave in the mind of the patron the idea that they are likely to spread disease. The toilets should be in a place reached easily either from the pool or from the shower-room. Indeed, the idea should be to make it easier for the patron to remember to use the toilet before going into the pool than for him to forget to do so. Signs in the shower-room or in the individual dressing and shower-booths should remind the persons taking showers, or getting ready to do so, that the taking of an adequate shower-bath and the use of the toilet is expected in the interest of the sanitation of the pool.

Shower-baths, preferably with warm water, should be taken by all persons before going into the tank. Soap should be used. When possible, the bathing should be supervised by an attendant, who would also be able to make a superficial physical examination, excluding any one suffering

from infections of the skin, colds and sore throat, and preventing anyone with an open wound from going into the water and endangering himself. It is easy to see that, if care is not taken to keep dirt and dangerous bacteria out of the pool, it will soon be necessary to let the entire poolful of water run down the sewer. It is economy to provide ample showers, and ample water at an agreeable temperature. Special devices intended to cause all patrons to walk through a shallow foot-bath of water and to pass under a shower have been devised and recommended. I have not had special experience with these, but I am convinced that adequate showers and actual inspection of bathers are most desirable.

Swimming Suits and Towels

Towels and swimming suits are sure to pick up matters of a most undesirable nature. If the towels and suits are to be supplied by the pool management, they must be adequately cleaned and actually sterilized after each use. To fail to do this is to invite trouble. Skin diseases are very likely to be spread by suits and towels. Clean towels and suits should very carefully be kept from contact with soiled ones. They may even cause trouble if carelessly handled. In one epidemic of skin disease with which I am personally familiar, cleaned and sterilized towels were contaminated at the towel room of the pool. On checking up, it was found that the towels were brought back in the baskets in which they went to the laundry, and were piled in places occupied during part of the time by soiled towels and suits. They also came into contact with the soiled towels. More careful handling of the towels resulted in the disappearance of the trouble. A careless towel-room attendant may do a lot of mischief.

And Don't Forget Adequate Parking Space

Provision of adequate parking space for automobiles is an important matter nowadays. Too small a space necessitates undue crowding, with danger to cars in getting them out in leaving, and this makes many people reluctant to go to the pool. A safe and sufficient parking accommodation would have resulted in increased attendance at several pools last summer.

A Milk Lunch at School

THE accompanying picture shows a noon hour scene in the public schools of Sioux City, Iowa, where Superintendent of Schools M. G. Clark has introduced a milk lunch dieting program. Noting the undernourished appearance of many young pupils, and the unsuitable food brought from home in their lunch boxes, Superintendent Clark induced the Board of Education to provide milk as a part of the children's daily luncheon. Incidentally, at noon hour, the children are taught table manners and the etiquette of the dining-room, and the parents are enthusiastic over the new idea.

THE NOONDAY LUNCH IN A PUBLIC SCHOOL IN SIOUX CITY, IOWA

Parking---When, Where and Why?

By Miller McClintock

Sheldon Fellow, Harvard University

Limited Parking

IN an attempt to solve the problem of street congestion in their business districts, practically all cities have now placed limits on the length of time which vehicles may be permitted to stand at the curbing. These limits range from ten minutes to six hours. The tendency has been to shorten the time with the increase of the problem.

Theoretically, these provisions do away with the "street hog" and make it possible for the drivers of vehicles to use the street in rotation. In actual practice, however, they have but little effect, for they cannot be enforced. It is estimated in most cities that if the entire police force had no other duty than the enforcement of parking restrictions, they would not be able to accomplish the task well. Evasion is made easy by the fact that owners can move their cars a short distance and thus gain the use of the street for another interval. Even though the fifteen-minute and half-hour limits could be enforced, it is to be doubted if relief would result. The constant moving in and out of spaces at the curb would cause disturbance to moving traffic, and in busy districts the available spaces would still be filled with standing vehicles.

Prohibited Parking

The difficulty of enforcing limited parking, together with the growing density of traffic which has seriously hampered the carrying on of essential transportation services in the congested districts, has led cities to contemplate a complete prohibition of parking. Boston, Buffalo, Chicago, Cleveland, Washington, Kansas City, New Orleans, Philadelphia, Seattle, and Portland (Ore.), have already prohibited parking in certain limited localities. These and other cities have contemplated an extension of the prohibition to the entire business district. Where the proposals have been made, they have always met with strenuous opposition. In Los Angeles, and in Washington, D. C., where an extensive prohibition was put into effect, the merchants were successful in bringing about an abolition of the rule within a few days.

The principle involved in prohibited parking is simple, and is one which cities will be forced to accept in the near future. The streets were dedicated for the purpose of travel and for acts incident thereto. Thus travel and the loading and unloading of goods and passengers are proper acts in the street. The storage of cars on the street, however, is an act not immediately connected with the purpose for which the streets were created. The fact that such a use of the street has been permitted in the past is no reason why it should be continued. Double parking by commercial and other vehicles which are forced to stop in the center of the street to discharge their loads, often completely blocks the thoroughfare. Double parking is an indication of supersaturation, and is the most threatening aspect of the present-day traffic problem. It means that the cars at the curb which are using the street for storage purposes are strangling essential transportation activities upon which the city must depend for its existence. The principle which should guide cities is this: when the use of the street for storage purposes impairs the use of the street for purposes of transportation or for acts directly connected with transportation, the former use must be prohibited.

The actual effect of prohibited parking on business has never been determined, for a fair experiment has never been made. Shops which cater to the poorer classes in the community will not be affected, for their patrons do not usually shop from motor cars. The exclusive shops will be little affected, for their patrons come chiefly in chauffeur-driven cars which need not park, but can continue on out of the restricted district and return later for their passengers. The extent to which middle-class shops will suffer depends on a number of elements: the availability of paid storage spaces in close proximity; the number of their patrons who come in mo-

tors; and, finally, the adequacy and convenience of other forms of transportation, such as trolleys, subways, and motor busses. That prohibited parking will keep some small per cent of the population from the accustomed markets in the center of the city is probable. This patronage, however, will not be lost to the city, but will be absorbed by the local neighborhood stores, thus bringing about a decentralization of interests, which is greatly to be desired.

Prohibited parking will bring about an automatic elimination of many of the low-utility passenger cars which now crowd the streets. Many owners who now use their cars simply for the purpose of transporting themselves to and from their work, will be inclined to use rail or bus transportation rather than leave their cars outside of the prohibited area or pay storage upon them within the district. It seems scarcely fair that cities should continue to provide space with a property value often as high as $25,000 for the storage of cars which are not of sufficient utility to owners to warrant their paying from 25 to 50 cents for their housing.

Public and Private Storage Facilities

Can adequate storage spaces be provided for those drivers who are willing to pay for the storage of their cars? It must be answered that at present no city has such facilities. In Boston, for example, it is estimated that 10,000 cars would be turned off the street by a parking prohibition, while public and private garage facilities have a capacity of only a fraction of that number. For this reason a gradual prohibition should be undertaken, beginning with the most seriously congested localities and slowly extending to the entire congested district.

The experience of a number of cities shows that public and private storage facilities will be constructed where the demand is sufficiently great. In Cleveland, a publicly owned plot of land in the center of the city has been converted into a parking square. A nominal charge is made, the square is constantly filled with parked cars, and the city obtains a substantial revenue. In Chicago, a portion of Grant Park between Michigan Avenue and the lake front is used for a similar purpose. The space accommodates approximately 3,000 cars, and a fee of 25 cents is charged. Other cities could profitably use their vacant lands in the business district in a similar manner. In New York, Boston, San Francisco, and Los Angeles it has been proposed that excavations be made beneath city parks and that such space be used for storage. The cost of the undertaking has kept the suggestion from becoming popular.

Private facilities offer the greatest relief. In Los Angeles there are several hundred privately-owned parking lots in the congested district. These house thousands of cars at a fee of from 25 to 50 cents per day. In many cities there are vacant pieces of land in the interior of the blocks and behind the present buildings. If parking were prohibited on the streets, it is believed that the demand would be such that the owners of these plots would find it profitable to use them for storage spaces.

The automobile hotel, or down-town garage, is another source of relief. In Boston, Los Angeles, and San Francisco, for example, there are a number of such structures, and it is understood that they have been uniformly profitable at moderate fees. With proper building laws, there is no reason why such a structure should either add to the fire hazard of the business district or detract from its appearance.

With the growth of street congestion and the progress of prohibited parking, the provision of private storage spaces as integral parts of office and mercantile buildings is to be anticipated. There are already several examples of this in the United States. In Los Angeles, the newly constructed University Club building in the center of the city provides a built-in garage capable of storing the automobiles of the members. In the same city, the Pacific Mutual Life Insurance building has a two-story basement especially designed to store the cars of its officials and employees.

The Traffic Problem Is Largely One of "Floor Space"

That city which first provides floor space sufficient for all kinds of traffic will be ahead of any other city which hopes to compete with it in progress.—EDWARD S. JORDAN.

A Museum for Every Town

Assistance Available in Organizing and Financing New Museums and in Improving Small Existing Museums

By Louis Resnick

THERE is in every city and town a Tut-Ankh-Amen's tomb of relics and wonders which ought to be broken into and appropriately displayed for the benefit of present and future residents and visitors. Untold treasures of historical, scientific, and artistic value lie hidden away wherever people live and have lived. These treasures should be brought to light and made easily available to all for their educational and cultural value.

The search for these objects in one's home town may not afford as spectacular an adventure as the Luxor excavations into the mausoleum of the Pharaohs; but in the long run it will prove even more interesting locally, because Egypt is thousands of miles away and most of us can never get there, while everyone could go to a museum in his own town, and the things he would see there would usually concern him much more intimately than the objects in an ancient and almost forgotten monarch's resting place.

This, in a nutshell, is the philosophy of Laurence Vail Coleman, Secretary of the American Association of Museums, whose headquarters are at the Smithsonian Institution in Washington, D. C. It is, however, no static philosophy. For, as Secretary of the Association and as Editor of *Museum Work*, the magazine of museum executives and professional museum workers, he has been busy for several years helping communities already having museums to make their exhibits of greater service and smoothing the way for those interested in developing a city's first museum.

It is the purpose of the American Association of Museums to assist in the organization of a museum in each community where there is sufficient interest in the subject. The movement offers a double opportunity for distinction—an opportunity to each city to create something of permanent value and interest for itself and thus attain a higher civic plane; and an opportunity for public-spirited citizens and enterprising city officials to gain local distinction by becoming the founders of an institution that will live long after them.

Nothing is more likely to inspire the citizens of a community with civic pride than a museum in which are recorded, by material exhibits, the history of the place, its natural resources, its arts, the processes and products of its industries, and, in addition, in which are exhibited interesting things which have been brought to the community from far corners of the world. One of the things which lend so much charm to European cities—the small ones as well as the capitals—and attract to them so many visitors, including the hosts of Americans who travel to them, is that they generally have museums steeped with things about which for ages back the traditions of the town have been woven. Nearly every town on the other side of the Atlantic possesses a museum in which are displayed objects through which its history may be traced, in which its artistic creations may be viewed, and where the products for which it is most famous, and the processes in their manufacture, may be studied.

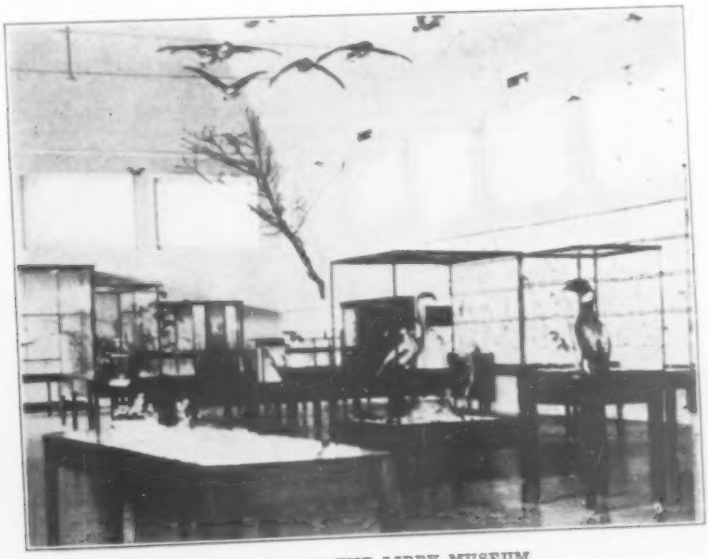
American communities are now sufficiently grown up to do likewise. The establishment of such museums in American towns would make them more interesting places in which to live, and would give more justification to the slogan, "See America First."

The American Association of Museums has issued an invitation to individuals and organizations throughout the country that are interested in establishing museums in their respective communities, to organize local committees for this purpose and then to communicate with the Association. The Association will furnish assistance and guidance in organizing and financing the enterprise and will acquaint the committee with the methods which have proved most successful in other cities. In particular, the Association seeks to obtain the interest of school officers, historical and art societies, scientific and technical bodies,

THE LIBBY MUSEUM AT WOLFEBORO, N. H.

business leaders and municipal officials. Directors of small existing museums are also urged to avail themselves of the Association's facilities.

The Association has prepared outlines of the scope of typical small museums which should prove of inestimable value to those interested in the movement. Large cities, of course, have facilities and sufficient funds for the maintenance of separ-



INTERIOR OF THE LIBBY MUSEUM

ate museums of art, science, history, and industry. For the smaller city where there is at present no museum of any sort, Mr. Coleman recommends the building up of one general museum giving attention to all these subjects. He suggests, for instance, the collection of accurate information about authenticated historical objects, such as old costumes, house furnishings, implements, weapons and manuscripts, which trace the community's founding and growth; natural history objects, including local animals, plants, and minerals; works of American art, with special attention to work produced in the community, together with small collections of art objects of other times and places; and exhibits showing the materials, processes, and products of local industries and commercial organizations, these last serving to give citizens a better understanding and appreciation of the importance of their community in the realm of business.

The community which is wise and courageous will, in planning the establishment of its first museum or the rehabilitation of an old museum, do well to plan on the principle laid down by the late Daniel H. Burnham, architect and city planner, when he said:

"Make no little plans. They have no magic to stir men's blood, and probably themselves will not be realized. Make big plans; aim high in hope and work, remembering that a noble, logical diagram once recorded will never die, but long after we are gone will be a living thing, asserting itself with ever growing insistency. Remember that our sons and grandsons are going to do things that would stagger us. Let your watchword be order and your beacon beauty."

"Labeling" Buildings and Other Fire Prevention Suggestions

IN a recent letter to THE AMERICAN CITY, F. W. Fitzpatrick, consulting architect, of Chicago, offers several suggestions for activities to reduce the fire waste in American cities. To quote in part:

"The whole fire situation could be absolutely controlled by the insurance people. They have given a hand to fire prevention, and now have experts, engineers, bureaus, all at work bettering conditions. I would ask them to take another step—a more drastic inspection of buildings, particularly the public and semi-public ones, theaters, hotels, offices, factories and such. A fire-door found blocked open, old hose dried out and useless, rusted stand-pipes, sprinklers and such equipment should subject a building to increased rates—a species of fine; a second offense or failure to do as notified, cancellation of insurance—and you have much of our fire loss right in hand. Costs something, yes, but worth it. A bit heavier premium to pay for inspection, but after a time all premiums could be lowered. Even repairs could be done by the insurance companies—repairs or replacement needed in fire equipment—and charged to the owners of buildings. All the companies are, together, virtually one affair, and the underwriters, as a body, have autocratic power by reason of their rates and schedules. If they really want to reduce fire losses, let them prove it by initiation of this system.

"It may take time to secure requisite legislation or authority, for the owners of cheap buildings will object, but the cities—urged by insurance—can do something else we have clamored for for years, something most effective—the 'labeling' of buildings. Classify them and label conspicuously at their main entrances, 'Fire Resisting,' 'Ordinary,' 'Dangerous.' Note the alacrity with which the man with 'Dangerous' over his door will revamp and better his building so as to meet a higher classification; or he will tear it down altogether and build decently.

"Then we can urge legislation that will amend our system of taxation. Now, the more a man spends on his building, the better he builds it, the safer it is, requiring the minimum of city protection, fire departments, water pressure, and all that, why, the greater his taxes! Change all that so the fellow with the old, inflammable tinder-box of a building—requiring the maximum of city protection and constituting the greatest danger to all surrounding property—will pay the higher rate of taxation.

"It is passing strange, but interesting withal, that in all reforms the masses have to be compelled to do certain things by authority and the authorities have in turn to be compelled to apply these compulsory measures by the weight of public opinion; public opinion in turn is molded, created by printers' ink; and I know of no cause that deserves better at the hands of the press than does this one of fire prevention."

How Should Water Taste?

A Plea for More Palatable Water

By John R. Baylis

Principal Sanitary Chemist, Baltimore Water Department

WE know that water, as ordinarily found, is not pure, but contains small amounts of chemical substances in solution and suspension. While the salts occurring in the average water are small in amount, they may impart tastes and odors to it, some of which make it more palatable, while others make it less palatable. In a few localities there are springs and wells where the water possesses a taste pleasing to all. Such waters are not frequently found and constitute a very small per cent of the ground waters of our country. Very few public supplies are satisfactory in taste to all consumers. In many cities the amount expended for spring or bottled water is enormous. There are no large cities where bottled water is not sold if it is available at a reasonable cost. This, of course, applies to places where it is purchased because it is more palatable than the public supply, and not where it is supposed to have medicinal qualities. Part of this may be attributed to a mistaken idea that spring water is naturally better than any other, but in most instances the reason is its palatableness.

Nothing is taken into the human system more often and in greater quantities than water. It constitutes a large percentage of our foods and beverages. While most of the water necessary for life may be obtained in this manner in the cooler months, most of us consume a considerable amount in addition to this in the summer months. Many health authorities now advise an increase in the amount of water consumed, as an aid to health. If this is a fact, anything that adds to the palatableness of our drinking water aids health by increasing the amount consumed.

The taste we ordinarily find in water is the combination of a variety of tastes produced by the various compounds in solution. Some people are more sensitive to certain tastes than to others. Compounds that might impart a very noticeable taste to one person might not be detected by another. It is believed that herein lies the reason for such varied opinions as to the palatableness of many waters. By continued use, certain tastes become so familiar they are not noticeable. Such tastes are not very objectionable and possibly would not justify a great expenditure for correction. There are, however, objectionable tastes in many of the waters of our country that will always remain objectionable, unless removed. It is the removal or prevention of these that should receive more consideration from our water-works officials than heretofore. Changes in our modes of living, and the vast amount expended for things that add comfort and pleasure to our lives, justify the assumption that we are now ready for more rapid progress in improving the palatableness of our drinking water.

Progress in Water Purification

The great progress being made in water purification gives us hope that we will have better-tasting water in the future. Hardly a city or a community is now supplied with water dangerous to health. Nearly all the muddy surface supplies are filtered, and practically all polluted supplies are treated with chlorine or rendered safe by some method, such as storage or filtration. Some cities resort to storage, filtration and chlorinization. We no longer take a drink of water with the fear that it will contain the deadly typhoid germ. So great has been the desire to produce water that is safe from a sanitary standpoint, that its palatableness has been sacrificed in many instances. This is the proper thing to do, should one or the other have to be sacrificed, but water may be made safe without so doing. In some instances, chemical treatment and filtration have not improved the taste; in fact, in a few instances it seems to have made the water worse. This

is due to improper treatment and may be easily avoided. Rapid sand filtration is an art developed greatly in advance of the science. Progress is being made, however, in the chemistry and biology of water treatment, and we may expect great improvement in the future. The health authorities have been satisfied as to the sanitary qualities, now we must satisfy the consumer as to palatableness.

Not long since, the superintendent of a filter plant made the remark that the water was all right when it left the filter plant and it was not his fault if it got bad before it reached the consumer. It is hoped that this feeling is not shared by many filter operators. A cure for such feelings would be to construct dead-end mains, so that the water for the filter operators will stand in the main at least a week before being used. One instance is recalled which resulted in the use of spring water by the operator. The filter operator should be interested in the water that reaches the consumer and not necessarily in that which leaves the plant. Corrosive water may leave the filter plant very palatable, but reach the consumer quite different. What the consumer wants is water that is pure bacterially, palatable and clear. The great progress in water purification has been confined largely to the purity and the clarity. No universal program has been started to improve the palatableness of our waters. Here and there we find an attempt to improve a very bad-tasting supply, but very little has been done. Water-works officials usually make the excuse that the objectionable tastes are naturally in the water and there is no way of removing them. The tastes are not naturally in the water when it is in the clouds. There is hardly anything as tasteless as pure rain or distilled water. The problem of the future is to see that the pure rain-water reaches the consumer with the substances producing desirable tastes added and those producing objectionable tastes left out.

Improving the Palatableness of the Baltimore Supply

The palatableness of Baltimore's water is not all that is desired, but we can say there has been an improvement. This has been brought about by increasing the storage and by improving the efficiency of the purification plant. The construction of a larger reservoir required the partial purchase of two small villages that constituted the closest source of pollution. The time of storage has been increased from a few weeks to several months, resulting in a marked decrease in the number of bacteria present. A sanitary inspector on the watershed has also done much towards the abatement of pollution. Most of the disagreeable tastes in our water since the use of chlorine can be attributed to chlorine, consequently the elimination of pollution and increasing the time of storage has greatly helped to insure a safe water without using an excessive amount of chlorine. Next to chlorine tastes have been those caused by corrosion of the service pipes. Properly treating the water has reduced corrosion to a minimum, so there are practically no tastes from this source. Before the days of chlorine, this was probably the greatest cause of disagreeable tastes, not only in Baltimore, but in most cities having soft water. It seems strange that very little effort has been made to prevent corrosion, when it may be done so easily. The savings in repairs to pipes would justify the expenditure in most instances. Baltimore's water may be too soft to make it the equal of the most palatable spring waters, but it is possible to improve it to where it will approach them. There is one problem, the solution of which is practical, and when done will make our water excelled by none: it is the control of micro-organisms in the reservoirs. It is believed the results will fully justify the expenditure. In the last two years, micro-organisms have been directly responsible for the annual use of over $15,000 worth of chemicals more than should have been required; consequently, the expense of controlling their growth may be largely offset.

Causes of Objectionable Tastes

The causes of objectionable taste in water are quite variable. It may be from some chemical, such as iron, chlorine, or an alkali; from some organic compound, such as decaying vegetation; from microscopical organisms, corrosion, pollution by trade wastes, chemicals used in treatment, or other sources. Most of these causes may be removed at a reasonable expense.

Salts in solution, such as the chlorides and the so-called alkali waters, present a very difficult problem. The best solution in

many such cases is probably another supply. The sodium compounds are so soluble that their removal from water on a large scale is very expensive. In the alkali regions, chemistry and not engineering should be given preference in the selection of a supply. Fortunately, there are not a great many supplies affected by sodium compounds to an objectionable extent. It may be best in some localities to depend entirely on rain-water for cooking, drinking and a few other uses. A few salts added to make it non-corrosive will produce a very palatable water. The cost is well within the bounds of possibility. It is estimated that the amount expended for water is not over 1 per cent of the average living cost—possibly not as much for each individual as most men spend for their collars and neckties. If food is over 30 per cent of the living cost, and water is taken into the human system in even greater quantities, we readily see why a tremendous increase in the cost of water would not be imposing an undue burden. If the uses of a certain water were confined to drinking and cooking purposes, 10 gallons per capita per day would be a liberal allowance. At this rate, 12 inches of rainfall annually would produce enough water per acre for approximately 100 people, if it all could be collected and saved. A reliance on rain-water is practical in most localities, and at a cost well within the bounds of what might be expended for drinking water.

Iron.—The methods of removing iron from water are so well known that it is not necessary to discuss them in this paper. It may be reduced to where it is not objectionable at a very reasonable cost. Where water is filtered, iron is usually removed without making any extra provisions.

Organic Compounds.—Very little is known of the organic compounds existing in water. The fact that they have not occurred to an objectionable extent in many supplies is partly responsible for the present lack of knowledge on the subject. The vast number of organic compounds, many of which might exist in water, and the difficult methods of determination as compared with the inorganic tests usually conducted on water, have tended to prevent any one from tackling the problem. Water purification has not offered a very attractive field for the organic chemist. Many of us have realized only recently that organic chemistry played a great part in water purification. We are now trying to solve such problems by the hit-or-miss plan. If we do a certain thing and it improves the quality of the water, all is well; but if the organic compounds change the next day and results are not so good, we wonder why. This state of affairs is not going to exist much longer, for we are going to brush the dust off our books on organic chemistry and get busy.

Micro-Organisms.—What has been said about the lack of knowledge of organic chemistry as applied to water purification applies almost equally to micro-organisms; in fact, micro-organisms and the organic compounds are so intimately related that one can hardly be considered without the other. It is likely that organic life produces most of the changes in the organic compounds of water. Where water is stored, they may become of great importance. The fact that over five million living organisms averaging 0.01 mm. in diameter may exist in an ordinary drinking-glass full of water without being detected, shows what a vast biological factory for the changing and producing of organic compounds might exist unaware to any one except the biologist. So long as this biological factory confines its work to the production of inoffensive compounds, it is not of serious consideration, but when it produces offensive odors, disagreeable tastes, and possibly poisonous compounds, it becomes of great importance.

Copper sulfate and chlorine, if properly used, are very effective weapons in keeping organic life under control in reservoirs. It is desirable in most instances to kill the vegetable life at its point or origin rather than to attempt to kill the higher forms of animal life later on in the reservoirs. Part of the organic compounds in water may be organized by the vegetable organisms from the carbon dioxide and other substances in the water. To kill organic life does not necessarily remove the organic compounds, but may leave the compounds in the water to be used later by other micro-organisms. We thus see the value of preventing the first growths of organic life in reservoirs. The lower forms of vegetable life are also very easily killed by copper sulfate and chlorine, whereas the higher forms of animal life are not. Considerable work has been done on the control of microscopical

growths in reservoirs by a few water-works with varying degrees of success, but such work has not received the consideration deserved. Many water-supplies are badly in need of systematic control of the microscopical growths in their reservoirs. More effective methods may be discovered in the future, but there is now no reason why offensive odors and tastes caused from such sources should be tolerated.

Corrosion.—Tastes produced by corrosion of the service pipes are confined largely to the softer water. Occasionally a fairly hard water will corrode iron pipe, but it is an exception and not the general rule. Heretofore we have been at a loss to understand why some waters were more corrosive than others, with very little difference in the chemical compounds in solution. The hydrogen-ion concentration now explains the reason. Two waters may have the same alkalinity and one be very corrosive while the other is not. The concentration of certain salts in solution has some effect, but there is almost a direct ratio between corrosion and the hydrogen-ion concentration of the water when the pH is below about 8.0, notwithstanding the fact that several authors have recently tried to show that the hydrogen-ion concentration within the limits ordinarily found in water has no effect. Protective coatings will form if calcium carbonate is present and the pH is above about 8.0, consequently there is practically no corrosion in many of our supplies. Fairly hard waters may form the protective coating when the pH is slightly below 8.0.

The author spent a few hours recently in a city of over 30,000 inhabitants and was impressed by the number of citizens complaining about the water. A visit to the filtration plant revealed a soft water with a pH of about 6.9 being treated with alum and a slight amount of lime. This produced a pH of approximately 5.0. There were indications that the pH varied from about 4.6 to 6.0 all the time in the filtered water. Repairs to service pipes will eventually cost the consumers more than would be necessary to make this water non-corrosive. The advantage of having satisfied customers would be well worth the expense even if there was no saving in pipes. If this condition is found in many cities, it is time someone is "waking up."

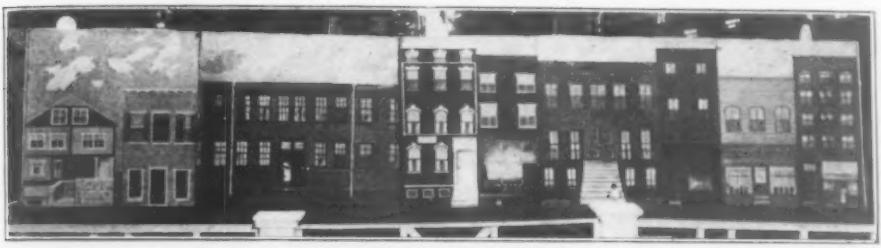
Other Causes.—Chlorine is the cause of disagreeable tastes in many cities. The remedy is to improve the quality of the water to the point where an excess is not needed. Trade wastes and chlorine combined produce unpleasant tastes in some supplies. Such wastes as may affect a public water-supply should not be allowed to enter it. With the exception of chlorine, tastes produced directly by chemicals used in treatment are rare. It is possible to treat practically any kind of water with a coagulant and add no disagreeable tastes, nor increase those already present. In most instances coagulation and clarification reduce the tastes. Occasionally, softening plants may apply an overdose of lime and produce a caustic lime taste, but such conditions are due to errors and are not continual.

How to Have Palatable Water

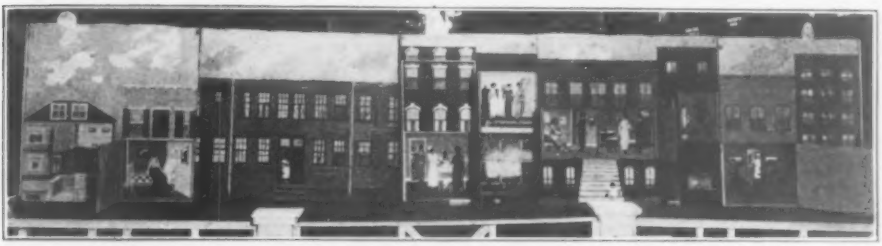
If water was a competitive commodity like some of our foods, there would be more progress in improving the taste within five years than there will be in thirty under our present procrastinating method of doing things. The water-works are necessarily monopolies, but they are to serve the people. If the people are willing to pay the price, they should have what they want. Very few consumers will make complaints even though conditions are almost intolerable. It is not only the privilege but the duty of every one to make complaints when conditions are not satisfactory. A tremendous overdose of chlorine in the Baltimore water one day last year produced a very disagreeable taste, yet resulted in complaints from considerably less than 1/50 of 1 per cent of the consumers. Such conditions may give the management a false conception of the wishes of the consumers. When the water is not satisfactory, make complaints. Do not depend on your neighbor; he may be depending on you. "Kick" so hard that it will make the political foundation of the city hall tremble, and cause great uneasiness as to the safety of the structure. Practically all our foods undergo some preparation to make them more palatable, yet it seems that we expect nature to supply us with an abundance of water pleasing to the taste without any effort on our part to make it more palatable. If you want pure, palatable water, demand it. It can be supplied to you at very reasonable cost.

ACKNOWLEDGMENT.—From a paper read before the annual convention of the American Society for Municipal Improvements, at Atlanta, Ga.

A Child Hygiene Exhibit That Worked



THE "STREET" WITH THE FLAPS DOWN



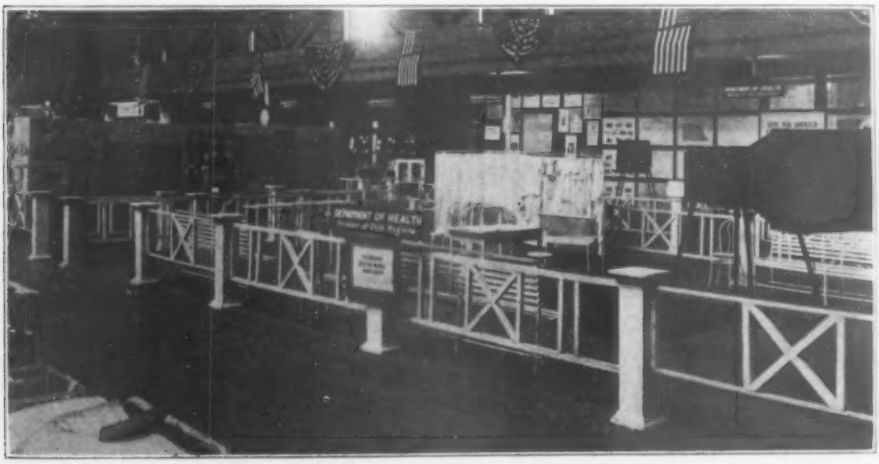
THE "STREET" WITH THE FLAPS UP

THE accompanying views show an exhibit prepared by the Bureau of Child Hygiene of the Department of Health of Newark, N. J., as a feature of a public health exhibition recently held in that city.

The distinctive feature of the exhibit is the representation of a street in the city of Newark in which, by means of flaps which can be opened showing the interior of the rooms, each type of work carried on by the Bureau is illustrated, such as:

Expectant Mother	Boarding Home
New-Born Baby	Colored Infant
Prevention of Blindness	Pre-School
Unmarried Mother	

It was found that this method of visualizing the activities of the Bureau of Child Hygiene aroused considerable interest and gave an opportunity to explain in detail the character of the work.



GENERAL VIEW OF THE NEWARK CHILD HYGIENE EXHIBIT

A Fire Prevention Campaign with an Exhibit Like This:

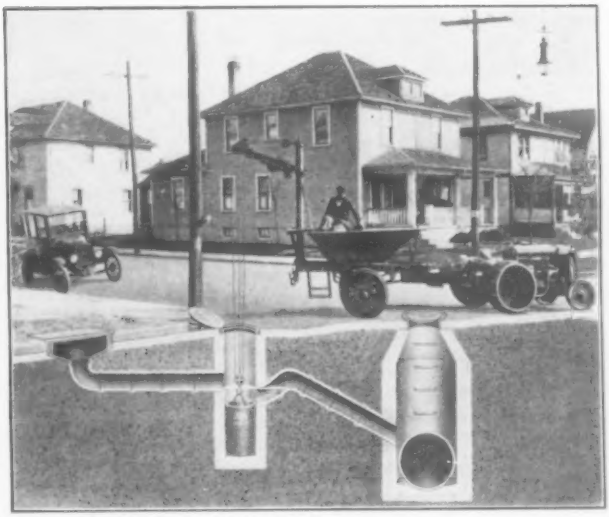
THE A·B·C's OF FIRE PREVENTION
ALWAYS BE CAREFUL
Keep your home or place of Business Cleaned up at all times
Know the Location of the Nearest Fire Alarm box and turn in
an Alarm immediately in Case of Fire
Keep at least one Fire Extinguisher in a handy place for immediate use.
TO SEND IN AN ALARM!
Break the Glass, open Door
Pull down the hook and let go.
REMAIN AT BOX UNTIL FIRE DEPARTMENT ARRIVES

May Help to Prevent a Disaster Like This:

A System of Catch-Basins for Richmond, Indiana

By D. B. Davis
City Engineer, Richmond, Ind.

IN the districts of Richmond, Ind., where the street pavements are constructed of gravel or macadam and where storm water is permitted to enter a combined sewer lateral, it is deemed advisable to construct catch-basins in connection with the street inlets. A year ago a system of catch-basins which employs a removable metal lining was brought to our attention. The system seemed so practical and simple, both in construction and in cleaning, that this city determined to try it out.



STREET SCENE AND SECTION SHOWING STREET INLET, CATCH-BASIN AND SEWER MANHOLE AS CONSTRUCTED IN RICHMOND, IND.

The construction of the catch-basin involves the excavation of a hole 3 feet in diameter and from 7 to 8 feet deep; the depth being dependent on various conditions, such as gas and water pipes. The earth bank acts as the outer form for the concrete lining. The bottom and the walls of the catch-basin are of 1:6 concrete laid 6 inches thick.

After the completion of the excavation, the concrete for the bottom is placed in the hole and made smooth. Then the collapsible steel forms are assembled on the street and lowered onto it. The forms are made of 10-gage steel in two complete circular parts. Each part is 4 feet in length and comprises two or more segments of a circle. Between each two segments is a 2-inch metal strip on which are latches which fasten onto the abutting sheets and hold the segments together. Each sheet is reinforced at the top, bottom and center by a 1½-inch angle-iron, which is secured to the inner perimeter of the form. The two forms are set one on top of the other in the excavation and plumbed before pouring begins.

Concrete is then mixed to a wet consistency in a small batch mixer and placed in small quantities around the form, care being exercised to spade it well to secure a smooth wall. It requires about 1½ cubic yards of gravel and 6 sacks of cement to complete a basin. The inlet pipe and the outlet trap are placed against the form in their proper elevation and concreted into the wall. While the concrete is still soft, the iron ring which supports the cover is imbedded to the proper grade of the street surface.

The next day, when the concrete is set, the steel forms are removed. The latches on the removable side strips are turned in a vertical position, when the strips immediately come loose and fall forward. The larger segments are then loosened by slightly hammering against them, when they are jerked out by means of a rod with a hooked end which fits into holes in the angle-iron stiffeners.

The average cost to us of the complete basin is as follows:

1½ cubic yards of gravel at 1.35	$ 2.02
1½ bbls. cement at $2.80	4.20
20 hours' labor at 45 cents	9.00
2 12-inch elbows for water seal	5.00
Removable metal lining	30.00
	50.22
Ring and cover 250 lbs. at 4c	10.00
Total	$60.22

This system of catch-basins is a flexible one, as they can be constructed either in conjunction with a street inlet or separately, and can be connected with one or more inlets by means of pipes.

The metal removable lining is made of Armco 10-gage metal, with a hinged bottom which opens downward, allowing the street detritus to drop freely from the bucket. The metal lining is made to a true circle, 23½ inches in diameter at the top and tapering to 21 inches in diameter at the bottom, and 36 inches in length. The purpose of the tapering sides is to prevent binding when being pulled. Holes ⅜-inch in diameter and 8 inches on center are provided in the shell at the half and upper quarter point of the lining, which liberate any water remaining in the upper part of the lining.

For cleaning it requires the work of one man, who also drives the truck or tractor as the case may be. In actual practice it requires about ten minutes to complete the hoisting of the metal lining from the concrete basin and dump its contents into the truck. The hoist used is an ordinary one in use by automobile repair outfits and can be attached to a wagon, a truck or a trailer. This city uses a Fordson tractor and a Miami trailer for cleaning the basins. We can clean from 40 to 50 basins a day. This is a considerable saving over cleaning by hand, which requires two or three men to clean from five to six basins a day.

The features which deserve consideration are that the basins are simply and cheaply constructed; are sanitary both in operation and mode of cleaning; and the cost of emptying them is lower than that of most other known methods, since it requires no elaborate and costly equipment on which interest and depreciation charges must be paid.

Water-Meters in Philadelphia

THERE are about 114,000 metered services in Philadelphia, and 11,881 were placed during 1923. The Meter Division tested 12,400 new and 8,250 old meters, removed 7,893, reset 8,023, and repaired 8,143 in the shop and 3,144 on the premises.

There are about 281,000 unmetered services in Philadelphia. The water-rent receipts for 1923 from metered connections totaled $2,854,081.20. The corresponding receipts for unmetered connections were $2,978,223.66. Nearly one-half of the revenue is secured from less than 29 per cent of the total number of services.

The meters are owned by the householders, and repairs are made by the Bureau at the expense of the owner. The charge for removing, repairing and replacing a ⅝-inch meter is $3 plus the cost of new parts, if they are required.

The Meter Repair Division is housed in commodious, well-lighted rooms in the headquarters building, with a full complement of testing and repair apparatus. According to the annual report of Fred C. Dunlap, Chief of the Bureau of Water, for the year 1923, the personnel should be increased, in order to make possible more prompt service in the removal, repair and replacement of meters throughout the city.

Remarkable Mileage of Federal Aid Road Work

DURING the fiscal year ending June 30, 1923, 8,820 miles of Federal Aid roads of all types were completed, which, added to the mileage completed prior to the fiscal year, brought the total of completed projects up to 26,536 miles.

The projects under construction at the close of the year amounted to 14,772 miles and were estimated at 53 per cent complete. In addition to the 26,536 miles completed and the 14,772 miles under construction, there were at the close of the year a number of projects approved but not yet placed under construction, the aggregate length of which was 6,917 miles. The total cost of the roads completed during the year was $148,152,528, of which $63,087,079 was paid by the Federal Government through the Bureau of Public Roads.

	Miles
Graded and drained	1,860.1
Sand-clay	749.5
Gravel	3,815.4
Water-bound macadam	835.6
Bituminous macadam	452.9
Bituminous concrete	76.8
Concrete	1,440.3
Brick	78.8
Bridges	10.8

The Argentine Ant, a Scourge of Many Cities

By W. Dwight Pierce, Ph. D.

Consulting Biologist, Banning, Calif.

ALONG about 1880, there immigrated to our shores from some point in South America a small family of ants, registered in the files of the United States Bureau of Entomology under the name *Iridomyrmex humilis* Mayr, alias the Argentine Ant. They landed at New Orleans and established the family headquarters there. It was not many years before they became the dominant race in that fair city of the South.

These ambitious invaders continued to send out marauding parties, which established themselves in ever-widening territory around New Orleans, until they had invaded and captured all of Louisiana and Mississippi. On and on they spread, until they had gained the Atlantic seaboard in Georgia and South Carolina and had established themselves in cities of Texas.

But such a conquest even was not sufficient for the hordes of Argentinians, as they continued to multiply, and before long adventurous colonies appeared on the Pacific Coast from San Diego to San Francisco Bay. The Argentine ant is now a major problem in many cities from California to the Carolinas. It is such a problem that it demands the attention of mayors and city councils, city managers, boards of health, and realty boards, and huge sums of money are being spent in many communities to hold in check the ever-advancing, ever-conquering hordes.

In 1922, New Orleans, on its second year of eradication campaign, raised a fund of $50,000 to combat the ant, and the entire city was organized into districts, with committees to raise funds. The Mayor issued a proclamation. The newspapers devoted whole pages to the work.

Such campaigns, in a smaller way, have been conducted at Augusta, Ga., Hattiesburg, Miss., and numerous towns in the latter state. In Alameda, Calif., the City Manager sets aside a fund for ant poison, and the Boy Scouts distribute it where needed. Other cities, such as Palo Alto and Hillsborough, Calif., buy the poison and have city employees put it out. And thus the ant forces itself upon the public attention as a civic problem.

And it is no wonder that this ant pest is a problem, when we ponder on the organization of the invaders.

The Infested Area and the Danger Zone

The Argentine ant is still spreading and there is no present means of knowing how far it can and will spread. For instance, its original habitat is the Argentine Republic, but it now is known to occur in Chile and Brazil, in Cape Colony, South Africa, Portugal, and other parts of Europe, and throughout the Southern United States as far north as Wilmington, N. C., Nashville, Tenn., and the northernmost corner of California at an altitude of 5,000 feet. It is established under a mean annual temperature of 55 degrees, and within the zone of zero minimum temperature. There is all likelihood that if it can stand the extremes of winter it may ultimately become established as far north as the state of Washington, St. Louis, Mo., and Columbus, Ohio. As the ant is a frequenter of houses, greenhouses, factories, etc., it may easily become established in such places and pass a successful winter, and in due time we should find a race adapted to wintering successfully in our northern cities.

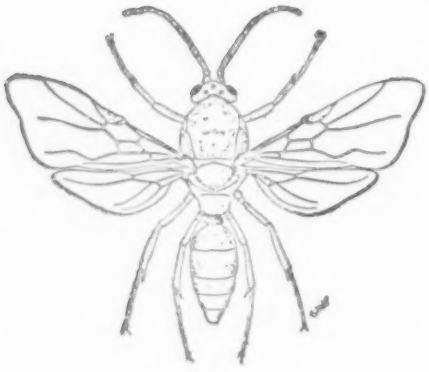
Cities desirous of keeping free from the pest should from time to time have an entomological survey made to determine if the ant is present and in the event of finding it, even in small numbers, immediately begin to proceed against it. In the early years of infestation its control is fairly simple.

The Labor Unions of the Insect World

Usually, when we think of an insect, we think of an individualist that lives for itself and its own offspring, and this fits most insects, but not at all the Argentine ants. They are organized in one of the most compact social organizations known. They are the labor unions of the insect world. The success of the colony is the dominant impulse of every individual. Self comes last. Division of labor has brought about supreme efficiency. There is no agreement as to minimum hours or minimum output. They work as long as conditions are favorable for work, and they rest as thoroughly as they work.

The queen is the head of a colony. She alone rules and, through her individual energy, the colony is multiplied. She depends upon her faithful workers to bring her food, and to feed all her young. When dangers threaten they must fight off the enemy if possible. If waters threaten to flood the nest, every worker must help in the removal of the helpless young to a place of safety. If the nest is disturbed, they must move without a moment's delay, and not a single baby ant is left behind. If any of the colony die, they must be removed so that the remainder of the colony will not be contaminated. If the cause of death is suspected, the workers avoid it in the future. There is no shirking of duty. There is, in fact, real intelligence shown by these tiny creatures.

During the active season—and in California and parts of the South there is no inactive season—the queen lays about 30 eggs a day, and in a normal colony has at least 100 workers to furnish the daily provender. As the number of heads to feed becomes greater, the duties of the workers increase. They must get food, or the colony will perish.



THE ARGENTINE ANT—ADULT MALE

A Remarkable System of Foraging

Thus has arisen one of the most remarkable systems of foraging known. From early dawn until sunset there pours forth from each nest, on certain well-defined trails, a stream of ants which may often be traced hundreds of feet. But from this main trail parties go off in every direction, until it is said that in a large infestation not one single square inch of ground, floor or wall surface is unexplored longer than an hour.

Watch the foragers, and you will find one stream headed for a garbage barrel, and the barrel fairly swarming with them. Another stream of foragers are tearing to pieces a dead animal and carrying the shreds to the nest. Here is a trail leading to manure, and another to some excrement. Here the sputum of a tuberculous person has attracted them.

But look at these trails going straight into the pantries, the sugar barrels, the meat and vegetables, and the bread boxes, depredating and destroying our precious foods, and if we leave them alone they will leave nothing whatever for us to eat.

But how about this? Can we eat with relish or safety food which has been trodden on, and polluted by their foul-smelling excreta? Can we be sure they did not come to our pantry straight from those germ-laden materials that we saw them visiting? No, on the contrary. Students of disease problems have proved that in cholera-infested sections the ants were carrying the cholera germs and distributing them to food. As long as we keep our municipal premises free of garbage, trash and disease-bearing materials, and just so long, can we be certain of freedom from ant-pollution of our foods. But what city does this?

It is bad enough to see our foods stolen and spoiled, but many householders stop right there, and when they have succeeded

in driving the ants out of the pantry, sit down and congratulate themselves that all is well.

How about it? Count the trails and see where they all lead. Yes, multitudes of trails never enter a house. Multitudes of colonies are camped at the roots of trees, and the workers never have to leave the tree. Multitudes of colonies are located in the strawberry beds, and truck gardens and find enough food right there.

How can that be? Examine the trees. The leaves are covered with sticky stuff and a sooty mold. The tips of the branches are alive with tiny lice, and the foliage is all gnarled and crumpled. The twigs are covered with scale insects, and here and there are great, fleecy clusters of mealy bugs in crevices of bark, on twigs and leaves. And the trees look sick. Watch the trails of ants. They are moving about among these other insects. Here is an ant among the lice. Look through your lens. It is sipping a drop of liquid from a tube on the abdomen of the aphid.

The Ants' "Cows"

Every grower of trees and shrubbery knows that when lice (aphides), scales and mealy bugs are present, his plants sicken and often die from exhaustion of the vital sap. But every grower and gardener does not know that there is any relationship between the ants and these sucking insects. Ants usually fight and destroy other insects, but, on the contrary, the Argentine ants care for these particular pests. In fact, they shelter them in their nests during winter, carry them out and place them on foliage, transport them to new feeding grounds, kill their enemies and cleanse them of the sugary excrement which constantly flows from their bodies.

It is this sweet substance, known as honeydew, which causes the ants to be so attentive. On the lice, you notice, there are two of these terminal tubes. We can, therefore, readily see why the aphides are called the ants' cows. The mealy bugs and aphides are the domestic animals of the ants, which they pasture out to draw the sweet juices from the trees and convert into honeydew for the ants. The worker ants gorge themselves on this liquid, until their abdomens can hold no more, and then they return to the nest to feed the colony. No matter what the food, it must be first ingested by the workers, and then regurgitated by them and fed in droplets to the queen and baby grubs.

The things that go on in the nest are very interesting, but make another story. We are now looking at the practical side of things.

We have seen that the ants invade our homes, taint and pollute, as well as destroy, foods, and that they propagate the worst enemies of our trees and shrubs and gardens. They do more. They actually destroy fruit buds, juicy fruits, strawberries, tomatoes, artichokes, and other vegetables. They may crawl into the ears and eyes of helpless babies. They greatly annoy bedridden invalids. They are a general nuisance.

The Municipal Problem

Let us estimate the ant colony in a city of 100 blocks. Let the average city block contain 20 lots, each 50 by 100 feet. Such lots will average 10 ant colonies of 100 ants each, or 1,000 ants to the lot, 20,000 to the block, 2,000,000 to the city. From about May 1 to October 31, an average of 30 new ants will arrive daily in each of the 20,000 colonies. That is, the city will have 600,000 new ant raiders each day for 6 months, or a total of 108,000,000, in addition to the original 2,000,000 ants, over a million to the city block, 10 to every square foot of ground surface. What chance have you to keep your food, if you do nothing to check this development? It takes a lot of work to catch up with such a multiplication.

And remember that these ants are propagating mealy bugs, in order to insure themselves food. A single female mealy bug may lay from 300 to 600 eggs, and there may be three generations in a year. Such multiplication would give us over 22 million offspring from a single mealy bug female in one year. If the ants are present, the natural enemies of the mealy bug are destroyed by them, and there is no check on the numbers of the pest. It is almost incredible, if we figure an average of even 10 mealy bugs per lot to start, what a mealy bug population we could have in a year.

The multiplication of the plant lice when protected by the ants is even worse, for after they begin to reproduce, a female gives birth to an average of 100 young,

which are mature in 10 days and then begin to reproduce. Think of it—multiplication one-hundred-fold every 10 days! Get out your pencils and see what it leads to. Stupendous! Yes, but look at the tips of the branches and the surface of the leaves, instead of counting the number present, and you will doubtless be glad to leave it to the mathematicians. Normally, parasites and predators check the multiplication somewhat, but the ants prevent such natural checks.

Is it not natural, therefore, that when such an annoying pest is common, realty values are seriously affected, and the reputation of a city as a place to live in suffers correspondingly?

How to Conduct a Municipal Campaign

To conduct a successful campaign, four things are necessary:

1. A director who understands where and how to find the ants and their colonies, and how to adapt his campaign to seasonal and biological conditions.

2. A whole-hearted backing by the community, from officials to citizens.

3. Sufficient funds to adequately cover the entire city with poison syrup.

4. A poison syrup, dilute enough in its toxic ingredient to cause the workers to imbibe freely and frequently, and to feed the entire colony with it before its effects begin to tell. If it is too strong, they will avoid it. And yet it must be strong enough to ultimately kill. It must not decompose, crystallize, ferment, or mold.

For general purposes, the following formula, recommended by E. C. Barber as a result of his experiments at New Orleans, is the most satisfactory:

To add:

To 18 pints water add 12 grams crystallized tartaric acid,
16.8 grams benzoate of soda, and
18 pounds granulated can sugar.
Boil slowly for 30 minutes and cool.
Add enough boiled water to compensate for evaporation.
Dissolve 30 grams chemically pure sodium arsenite ($NaAsO_2$) in 1 pint hot water, and cool.
Add arsenite to cooling syrup, and stir.
Add to poisoned syrup 2½ pounds good honey, and mix thoroughly.

This is applied at the rate of about one gill per can in 4-ounce flat baking-powder cans which have been perforated or have the top crimped under the lid to admit the ants. The cans are hung on the shady side of trees and on the houses, or set into the lawns. Sponges floating on the surface, or excelsior, will aid the ants in reaching the syrup.

For an ordinary 50-by 100-foot city lot, about five cans are needed, unless the yard is filled with trees and shrubs. Thus the number of cans to the city can be estimated. The initial cost of materials and of making the syrup will come to about five cents a can. The cans must be filled two or three times during the season, bringing the cost of materials above ten cents a can. The cans should be painted with green paint, or paraffined, to make them liquid-tight and rust-proof.

It is estimated that two men can put out about 1,000 cans a day, but local conditions will greatly modify this. The Alameda way of conducting a campaign is to utilize the services of the Boy Scouts as distributors, assigning each boy a block to watch. He puts out the cans, examines them periodically, receiving a signed statement from the house owner to this effect, and receives special honors as "ant killer," when he has done his work right.

Of course, inspection by experts is necessary to insure completeness, because vacant lots, and lots full of shrubbery, orchards, hedges, etc., are particular haunts of the ants. Results depend upon the thoroughness of application and inspection and capable direction. In gross infestations, it may take two or three years to effect a clean-up, and where neighboring communities are doing nothing, an annual campaign is necessary, because of the spread of the ants by transportation. Ant control costs money, but it is money invested in improvement of lawns and trees, in saving of food and health, and in making a city worth living in.

In California there is a state law permitting the creation of so-called "mosquito abatement districts," which is broad enough in its language and, in fact, was intended to cover the Argentine ant and similar pests. Under this law, when a district is formed and trustees elected, a tax can be levied to cover the cost of insect pest control. California cities should avail themselves of this law in combating the ant.

Reducing Traffic Accidents Through Organized Community Effort

The Second of a Series of Three Articles

By C. W. Price

Vice-President, in Charge of the Public Safety Division, Elliott Service Company, New York City

THE administrative officials of municipalities can do much to initiate in their respective communities thoroughgoing accident prevention work or to stimulate such work where it has already been started, and for the six reasons pointed out in the first article of this series they should do everything in their power to encourage and vitalize community safety activities. But before city officials undertake active participation in the public safety movement, they must themselves be convinced that it is possible to reduce street accidents, and before they can be convinced, they must know exactly how such reductions have been brought about in a number of cities. This article will discuss briefly the fundamental principles of traffic-accident prevention, the methods that have proved successful in cities representing practically every condition of life in America, and the agencies that must be utilized to put those methods into effect.

Men who have had occasion to watch the development of industrial safety are agreed that the success of that movement is due primarily to the fact that the pioneers in the movement worked out a safety program which is simple, which can be used in any plant, and which always gets results. For years it has been possible to go into any plant and say to the general manager: "If you do these five or six things, do them sincerely and consistently, you will reduce accidents in your plants 50 to 75 per cent." And thousands of plants have done just that.

The men who have been identified with the public safety movement since its beginning have been convinced that the only hope for any real progress lay in the possibility of developing a program of community safety as simple, as flexible, and as sure of results as the industrial safety program. Experiments in this direction have been tried in some two dozen cities. While many of these campaigns were fairly successful, it could not, until a year or so ago, truthfully be said that there had been developed a simple, workable plan for a public safety campaign which could be applied to a city of any size with the assurance of results in every case. In the last two years, however, out of the experience of many cities, there has been developed a program which discards the scores of trivial activities that characterized the early campaigns, and retains only those five essential activities that have been found to be of permanent value in every city in which they have been tried.

The most important lesson that has been learned in the first five years of the public safety movement in America is to utilize in each community certain existing civic agencies and to function them as great pieces of machinery which, when set in motion, are capable of reaching automatically, economically and continuously thousands of persons and impressing them with their personal responsibilities and opportunities for the prevention of accidents. The public schools constitute one such machine; the newspapers another; the police a third; motor trucks, taxicabs, and other commercial vehicles which are constantly on the streets, a fourth; etc. These agencies, and many others like them, exist in every community; the problem is to utilize them for the purpose of accident prevention without interfering with their normal functions. Not only has this been done successfully in many American cities, but the injection of safety work in the routine activities of these agencies has vitalized and enhanced their ordinary functions.

To utilize the existing machinery for reaching large numbers of people daily, it is necessary to establish a safety clearing-house or safety service bureau, preferably

as a department of some existing organization such as the chamber of commerce or the local automobile club. It is inadvisable, in most cases, to create a new organization; it is the universal sentiment among business men that there are already too many civic, social and business associations.

The activities which have been found to be the determining factors in the success of any community safety campaign have been so refined and standardized as a result of their use in more than twenty cities during the last five years that, given the proper leadership, practically the same results can be achieved in any community.

City officials and officers of local chambers of commerce have supplied such leadership in at least half of the cities which have done successful safety work during the last few years. The Mayor, the Chief of Police, the Superintendent of Schools, the Street Commissioner and the President of the Chamber of Commerce should be among the prime movers of a public safety campaign in every city where such a campaign is started.

Safety Week

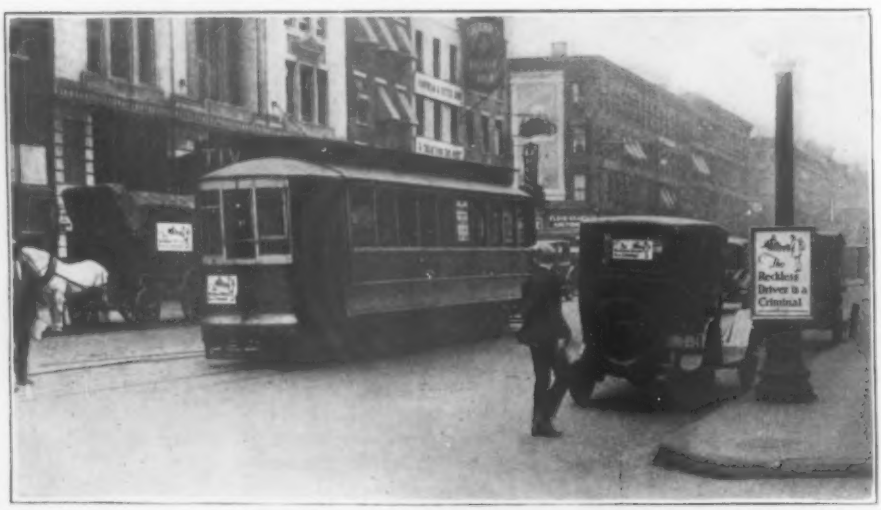
The experience of practically all of the cities which have undertaken permanent safety campaigns shows that the first essential is a Safety Week campaign, the effect of which is twofold: first, to attract wide-spread attention to the permanent campaign; second, by a striking demonstration in the reduction of accidents during that one week, to convince the people that it is possible to prevent accidents and to convince them of this fact so strongly that they say: "Why stop with a Safety Week? Let's have a safety campaign throughout the year."

This is evidenced by the experience of five cities which represent practically every condition found in any city in the United States: New York, the metropolis; Washington, the residence city; Pittsburgh, the great industrial center; Louisville and Baltimore, where traffic conditions are typical of a hundred American cities. In each of these cities a Safety Week campaign was conducted within the last year, with the following results:

ACCIDENTAL DEATHS

	Safety Week	Corresponding Week	Per Cent Reduction
New York	30	70	57
Washington	2	6	66
Pittsburgh	9	22	60
Baltimore	2	9	77
Louisville	1	3	66

These campaigns have demonstrated that more can be done in one week's intensive effort to convince all of the people that accidents can be prevented and to give wide-spread publicity to the safety movement than can be accomplished in an entire year



VISUALIZING SAFETY ON THE STREETS
The use of striking safety posters on poster-boards at street intersections, on street cars and on commercial vehicles

of ordinary effort. But an accident-prevention campaign which begins and ends with a Safety Week is worse than no campaign at all.

Safety Education in Public Schools

Students of the traffic-accident problem and investigators of traffic-accident causes are immediately struck by the fact that approximately a third of all automobile accident fatalities are among children. The one underlying reason for this is that the child is largely a creature of impulse; he does not know one minute what he may do the next, nor does the driver in front of whose vehicle he dashes after a ball or a playmate. There is only one cure for this situation, and that is to build up in the children of to-day a new set of habits which take into account the changes that have taken place since their parents were children. Toward this end there has been developed by Dr. E. George Payne, Professor of Education at New York University, a system of safety instruction in public schools which provides for the use of safety material in each of the existing studies. To illustrate: at least once a week in the drawing class each child designs a poster on safety. I have seen posters illustrating every kind of hazard, from stealing a ride on the back of a truck, to the right and the wrong way of crossing a street. In the writing lesson the children copy such sentences as this: "When I start to cross the street, I look to the left, and when I get to the middle of the street, I look to the right." In each schoolroom a safety patrol is appointed to guard the streets when school is dismissed, and to warn the children against crossing the streets when motor vehicles are approaching.

Through such activities safety is made a vital part of the child's daily life. The incorporation of this plan in its public schools enabled St. Louis to reduce fatal accidents to children from 49 to 18, and Detroit its child fatalities from 96 to 30 in the face of great increases in the number of motor vehicles; it enabled Washington, D. C., in the first nine months following the inauguration of a permanent public safety campaign, to reduce its accidents to children by 50 per cent.

Visualizing Safety on the Street

In the development of public safety the question which has claimed attention more and more is how to visualize safety, how to keep safety continuously and impressively before the people while they are on the streets. Professional public-safety men are now agreed that a year-round poster campaign presents the best solution of this problem.

A MOTHER TEACHING HER CHILDREN THE IMPORTANT LESSON THAT IN CROSSING THE FIRST HALF OF THE STREET THEY SHOULD LOOK TO THE LEFT, AND ON THE SECOND HALF TO THE RIGHT

If safety posters are to be effective for the persons who see them; if they are to be acceptable to the persons who are to authorize their placing; and if they are to keep up the interest of the community continuously, they must be done artistically and they must have "pep." No ordinary printing job or hastily written copy will do. The experiences of St. Louis, Milwaukee, Boston, Baltimore, Louisville and Washington, all point to the need of a year-round poster campaign for the prevention of street accidents. The posters should be prepared in three sizes, the largest for display at the more important street intersections, entrance highways to the cities, entrances to factories and schools, gasoline filling stations, public garages, in all public buildings and on vacant bill-boards. There should be a series of medium-sized posters for display

on the front of every street car. Still smaller posters should be used on commercial vehicles. The color of the poster, the illustration and the text should be changed each month.

Half of the posters should be directed against the pedestrian and half against the driver. Such slogans as: "The Reckless Driver Is a Criminal," "The Jaywalker Is Taking a Short Cut to the Hospital," and "Fools Used to Blow Out the Gas, Now They Step on It," together with bold illustrations visualizing the text, compel attention and exert their influence on driver and pedestrian alike. The very fact that a warning against carelessness is posted on either side of his vehicle tends to make the individual truck driver careful, even though the warning is directed against the other driver or the pedestrian. And when the jaywalker or reckless driver reads a safety message which is posted on a truck, he gets not only the message, but a vivid picture of what is likely to happen to him if he disregards it when that particular truck is headed his way. When such posters are widely distributed over the city, it is not possible for a driver or a pedestrian to come down into the heart of the city without being reminded a dozen times of the idea of safety; and he is reminded at the very points where the hazards are greatest. The driver may read accounts of automobile accidents while he sips his breakfast coffee, and by the time he backs his machine out of the garage he has forgotten them. But if on his way down town he is confronted at every dangerous street intersection with the accusing indictment, "The reckless driver is a criminal," he is compelled to think of safety. In the early part of the Washington campaign a prominent business man said to a friend, "I am a reckless driver; I'll admit it. But those posters on the street have got me. Every time I face one going down town I slow up."

POSTER USED IN SAFETY CAMPAIGN IN LOUISVILLE, KY.

Reproduced in three different sizes, for use on commercial vehicles, or street cars, and at street intersections

An analysis of motor vehicle accidents in New York City during one recent year revealed the fact that 53 per cent of the deaths resulting from all motor vehicle accidents involved commercial vehicles. The significance of this will be appreciated when it is recalled that commercial vehicles constitute approximately one-tenth of the total motor vehicles of our streets and roads.

Except through a general education it is difficult to reach the drivers of private passenger cars with any direct safety training. But it is possible, through their employers, to gather large numbers of drivers of commercial vehicles into a school for group instruction. The drivers of commercial vehicles are, in proportion to their numbers, the largest users of streets, and once interested in accident prevention they are in a position to do more than any other group of drivers to reduce the hazards of the street.

During the past four years schools for motor vehicle drivers, especially drivers of commercial vehicles, have been conducted in a number of large cities, including Washington, Chicago, Detroit, Milwaukee, and St. Louis, and always with large attendance and with far-reaching results. The experience in these schools has demonstrated that drivers can be reached and interested in safety just as quickly and quite as effectively as workmen have been reached in industry.

In the effort to reach every commercial-vehicle driver, these cities have found it even more important to place in the hands of every employer of drivers information which will not only convince him of the value of organized safety work but will equip him personally to instruct his drivers and to organize safety on a permanent basis in his own concern.

Help from the Newspapers

In an organized community effort for the prevention of traffic accidents, the newspapers constitute one of the most direct and effective mediums through which to carry

the safety message into the homes every day in the year. Because of the alarming increase of accidents and the aroused public interest, the newspapers in most communities are willing and glad to sponsor safety campaigns just as they sponsor a campaign to combat any evil that menaces the life of the community. In order to secure the intelligent and whole-hearted cooperation of the newspapers, however, it is necessary thoroughly to acquaint their editors in advance with the plan and purpose of the campaign, and to give the newspapers, not what is ordinarily known as publicity material, but articles and photographs of real educational value.

Not only the detailed plans of the activities which have been found to be successful in a number of cities, but the actual materials used are now available for any community. And with such plans and materials it is possible for the average American city to conduct a year-round carefully organized public safety campaign for less than the cost of one fatal accident. Exactly how any city of 25,000 or more population can organize and conduct a safety campaign along these lines and secure for such a campaign the hearty cooperation of the important business interests and the community at large will be described in the next and last article of this series.

Winnipeg Launches a Central Steam Heating Project

By J. G. Glassco

General Manager, Hydro Electric System, Winnipeg, Man.

THE Winnipeg Hydro Electric System, having built a steam standby plant within the city limits as a protection against interruption of service on the Hydro transmission lines, was faced with the problem of taking care of very heavy additional fixed charges, approximating some $75,000 per year. It was felt that some means should be adopted, if possible, to relieve the Hydro of this burden. An investigation was made of the possibilities of central steam heating, with a view to using the new boiler equipment of the standby plant for revenue-producing purposes. The results of the investigation looked so promising that the services of Messrs. Neiler, Rich & Company, consulting engineers, of Chicago, were obtained for the purpose of advising as to whether a central steam heating plant for the city of Winnipeg would be a practicable, sound business proposition. The report of the experts was so favorable that a by-law was placed before the electors at the municipal elections in 1923, and the undertaking was then approved by a large majority. This by-law, which was for the expenditure of $889,196, stipulated that $325,000 which was already being spent by the Hydro for boiler equipment should be charged to central steam heating account, thus leaving a net sum of $550,000 to be raised.

Apart from the general advantages of central steam heating, such as elimination of smoke nuisance and coal- and ash-handling and the considerable saving to be made in heating costs, there were many factors which influenced the electors in voting in favor of the by-law. Some of the more important were as follows:

1. The Hydro would sell to the central steam heating plant off-peak electrical energy which would be used, when available, instead of coal, for steam production purposes. This would produce a revenue of approximately $75,000 per year.

2. The fixed charges on the boiler equipment would be taken care of by the heating system, thus relieving the Hydro of the annual charges of $34,000.

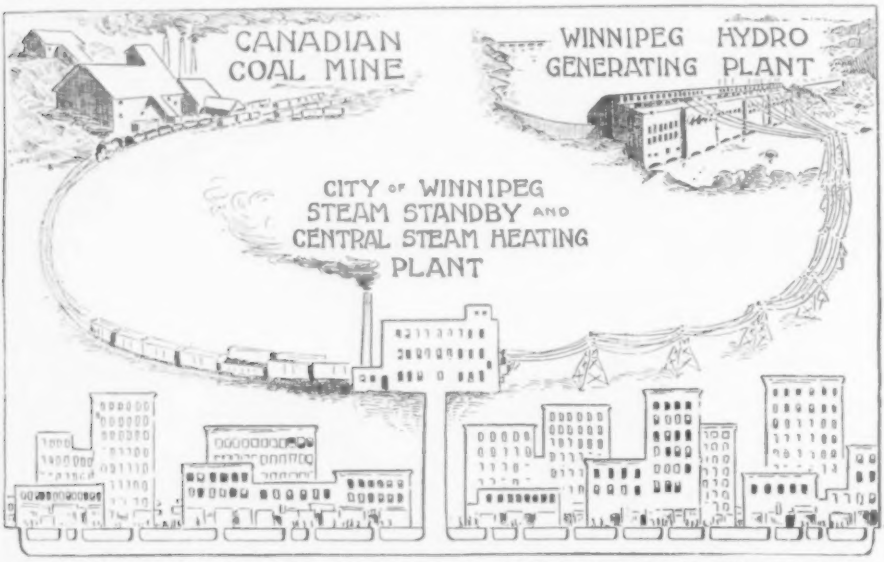
3. With the boilers always under steam and ready for immediate demand, the high-pressure fire protection plant could be completely electrified, resulting in a reduction in operating costs to the extent of $63,000 per year.

4. The water-works steam reserve plant would be eliminated, this service being supplied from the standby plant, with an estimated saving of $8,000 per year.

5. The development of Canada's natural resources by the utilization of the low-grade slack coal of the western mines, thus reducing the importation of thousands of tons of American coal now being used in individual heating systems.

Under the scheme as outlined, it is proposed to use pulverized lignite coal, which recent developments have proved will give as high an efficiency as some of the best-grade American coals. Endless quantities of low-grade lignite coal are available on the western boundaries of Manitoba at a cost of about $4 per ton laid down in Winnipeg. This, supplemented whenever possible with all the available off-peak energy from our hydraulic power development on the Winnipeg River, will be a large factor in making the central steam heating plant an economic possibility.

Winnipeg has a very great advantage over the other large cities that have made a success of central steam heating, inasmuch as we have a very low average temperature during the winter months and a long heating season, resulting in the use of the heating system for a much longer period for practically the same capital expenditure as would be required elsewhere.



HOW COAL AND WATER POWER WILL UNITE IN WINNIPEG'S CENTRAL HEATING PLANT

It is estimated that it will take five years to develop the system to its full extent, the city being divided into several districts and extensions being made annually until the whole business area of the city is covered.

There is no doubt that the progress of this new municipal undertaking will be watched with interest throughout Canada and the United States.

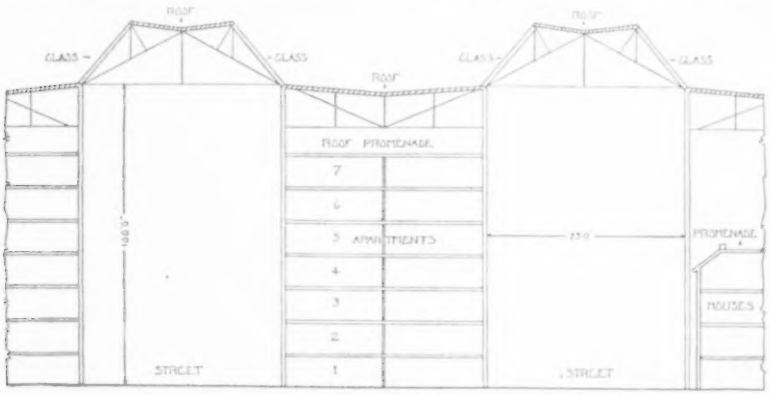
Progressive Cities Don't Have Blind Babies

THERE was once a time when a quarter of all new-born babies developed "sore eyes," ophthalmia neonatorum. Many of these babies were blinded for life. They formed a third of the whole burden of disability born by nurseries, schools and homes for the blind as well as by their own families. A few days ago, the Chicago Board of Health reported that, to the best of its knowledge, not one of the 56,724 children born in that city in 1922 has lost his sight. Cleveland believes that it has no blind child of less than three years. Massachusetts has not recorded an instance of the infection for more than five years. Grand Rapids has had a clean slate for so long that there is no case of blindness among its school children. Within the lifetime of the pioneers, such as Dr. F. Park Lewis and Louisa Lee Schuyler, who worked for the first legislation—the New York State law of 1890 which required notification of the condition—an unending campaign of education, lawmaking, and enforcement has demonstrated once more the truth of the credo that public health is purchasable—whenever we care enough to work to get it.

—From The Survey for January 15, 1924.

Will Future Cities Be Under Glass?

ENCLOSING an entire section of a city —a half-mile square, for example— roofing it under glass, and heating the whole neighborhood to a comfortable degree, is the interesting suggestion of Samuel R. Lewis, of Chicago, a member of the American Society of Heating and Ventilating Engineers, whose paper on the subject is published in the November issue of the *Journal* of that organization. The paper goes into considerable detail as to methods of construction, costs, and economies as compared with present methods of heating. Some of Mr. Lewis' arguments for his proposed giant conservatory are here quoted:



CROSS SECTION

"If we build this structure of the highest reasonable grade of construction now commercially possible, we might make the structures within its shelter the lightest of shells, built for privacy only. If the enclosure is lofty, no mechanical ventilation will be required, as the difference in temperature between the enclosure and outdoors will cause a rapid air change. Dust, temperature, humidity and even air motion can be controlled by artificial showers of rain, whenever these are needed, from sprayheads in the roof. Ponds of water may be utilized on the roof for their benign value in temperature regulation. Substantial reductions in the cost of living can be made by the garden truck which can be grown on the inner roofs and in the back yards. Any one wishing cold air may dress for it and pass outside.

"After much study and several sketches, I worked out as a sample, to satisfy my curiosity, a scheme for an enclosure approximately one half-mile square, 2,625 by 2,500 feet. It is to be arranged with steel columns 75 feet on centers, with a chimney at each column to care for the venting of kitchens, toilets, garages, and the like. The roof is to be about 100 feet above the ground, and great monitors 150 feet on centers run north and south, having high glass sides, so that the direct sunshine may transverse the entire area at some time every day. The glass will be triple, with cleaning galleries between the sheets, and will be hinged so as to be opened in summer.

"The structure with its heating would cost not to exceed $2.50 per square foot of area, or $16,735,000. All work done inside the structure will cost much less than the same work outside, because work can be carried on every day, regardless of outside weather conditions.

"We must always have heated buildings, because through more than half of every year we would suffer, and many of us would die otherwise. We spend by far the greater part of our time in small spaces without vegetation, often without air movement and frequently with insufferable odors. Why not, since we must recognize these facts, meet the issue in an efficient way by housing in great spaces, doing away with little enclosures? The canyons of streets and alleys between our modern city buildings are exceedingly inefficient and wasteful from every standpoint. If we roof them over with glass we can save the burning of great quantities of coal, thus saving some of the soot and dust. Much less labor will be required to clean the glass than is now used cleaning windows and streets. Flying bridges here and there between buildings will save much street congestion and much elevator service. The snow-handling problem of cities will be simplified wonderfully, as the snow can be removed without interference with traffic.

"I'll grant that it may be a few years before my sixteen-million-dollar, half-mile-square project will be floated, but I predict that the roofing over of streets in metropolitan districts will come quickly. The saving in heat will finance the construction."

Roughness as a Factor in Pavement Life

By A. T. Goldbeck

Bureau of Public Roads, U. S. Department of Agriculture, Washington, D. C.

THERE are certain types of road roughness, such as the inequalities in a concrete surface due to slightly projecting fine or coarse aggregate or to the brooming of the surface after finishing; the slight roughness of brick pavements due to the joints; and roughness of a similar kind in other types of roads; all of which are of little consequence in this discussion. Such slight inequalities are readily absorbed through the depression of the rubber tires, and very little vertical motion is imparted by them to the vehicle.

Roughness in Concrete Roads

There seems to be little excuse for roughness in new concrete roads constructed with the most modern methods, and yet there are many roads which, through lack of attention to every detail, are not smooth riding. Roughness in a concrete road can very readily occur if the side forms are insufficiently supported, or not sufficiently rugged, especially when a finishing machine is used, or when they are carelessly placed. Even with the smooth finish which can be accomplished, both by hand and by machine methods, a concrete road surface may still develop unevenness due to lack of homogeneity of the mixture or a non-uniform consistency, resulting in settlement of the concrete in some spots more than in others. The difficulty of maintaining a smooth surface in concrete laid on steep grades is also well known. Especially during cold weather, which interferes with rapid setting, motion of the concrete is apt to take place on hills, causing the formation of a series of waves. The difficulties of obtaining evenness at expansion joints have not in all cases been overcome. After several years of service, additional inequalities may develop due to subgrade settlement, slipping at expansion joints or heaving, or to incipient blow-ups from temperature and moisture expansion.

Rough Roads Are Rough on Traffic and on Themselves

From the standpoint of the road user, there can be no question of the desirability of as smooth a riding surface as can be produced. The instant a rough stretch of pavement is encountered, the vehicle driver is made conscious of it by reason of rapid, unpleasant vertical motion which is imparted to the entire vehicle, and a portion of which, at least, reaches the driver. He knows the exhausting effect on himself of a rough road in comparison with that of a smooth one. The vehicle owner also is quite conscious of the increased maintenance cost on his vehicle resulting from rough roads. What does this mean in terms of the life of the pavement itself?

Roughness in Bituminous and Other Types

The bituminous types are likewise difficult to finish with the desired degree of smoothness, and when the mixture or workmanship is not proper, waves develop under the combined action of traffic and warm weather. In addition, subgrade settlement is more apt to produce inequalities in roads of the flexible type than in the rigid type of pavement.

The chatterbox surface which develops in gravel roads is well known, and its effect on both the driver and the vehicle are quite apparent. Such waves seem to be caused by the combined action of the springs and the spinning of the wheels, and they increase very rapidly unless the surface is constantly maintained. Similarly, the other types of surfaces under the action of traffic and the expanding action of heat and moisture, both in the road surface and in the subgrade, in time develop roughness

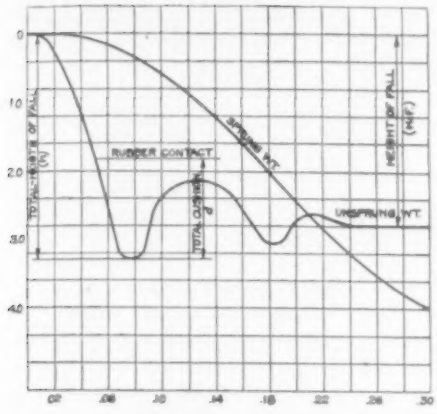


FIGURE 1. THE MOTION OF THE HUB AND BODY OF A TRUCK IN GOING OVER AN OBSTRUCTION

of different kinds and degrees, even though they may have been reasonably smooth just after construction.

Effect of Road Roughness

Let it be assumed that a high joint has developed in a concrete road and that a motor vehicle is traveling in the direction from the high side of the joint. Figure 1 illustrates the motion taken by the hub of the wheel and by the body of the machine during the time of free fall of the wheels. When the vehicle is running at high speed, for an instant the tire will be out of contact with the road surface, but immediately the force of gravity and the force due to the compression of the truck spring shoot the unsprung weight of the vehicle downward with high velocity. The body of the machine falls downward very much more slowly, since it is acted upon downward by the force of gravity alone, and this is counteracted to some extent by the upward force of the springs. When the tire comes into contact with the surface, pressure on the road is developed, which increases rapidly as the tire is compressed, and finally reaches a maximum value under the greatest flattening of the tire. The high vertical velocity of the wheel due to the kick of the spring and force of gravity is reduced to zero during the extremely short interval required to attain extreme compression of the tire. In other words, the unsprung mass of the vehicle has been decelerated and the pressure between the tire and the road surface has increased from zero at the time of initial contact to a maximum at the time of full contact.

The maximum pressure created on the road surface is entirely dependent upon the deceleration or rate of change of vertical velocity, on the mass of the unsprung portion of the vehicle, and on the spring pressure at the instant of maximum compression of the tire.

It is not necessary that sudden inequalities be present in a road surface to produce greatly increased pressure on that surface. Let us assume that a heavy vehicle is traveling at 20 miles per hour and that there is a rise in the road surface of ¼-inch in a distance of 1 foot. Let the unsprung portion of weight on one wheel be 3,000 pounds, and the sprung portion 6,000 pounds. Omitting tire compression, the vertical acceleration of the unsprung portion equals approximately 37.5 feet per second. The force on the road surface equals 12,480

FIGURE 2. A GRAPHIC STRAIN GAGE IN POSITION ON THE UNDERSIDE OF A CONCRETE SLAB

pounds, as compared with 9,000 pounds, the static weight of the vehicle. This would be the force created if the tire were of steel instead of rubber. The effect of the rubber is to decrease the vertical motion of the unsprung portion of the vehicle, thereby somewhat decreasing the pressure on the road surface.

It is likewise conceivable that a wave in a road surface will lead to impact when the speed is so high that the inclined approach of the wave shoots the wheel entirely free from the surface so that it lands with a free fall.

Measurement of Impact on Road Surfaces

In 1921 a large series of tests were completed by the Bureau of Public Roads, in which it was demonstrated that rather high impact pressures were produced on the road surface under conditions of artificial roughness. These measurements were made by determining the pressure required to permanently deform a small copper cylinder placed under the plunger of a hydraulic jack buried under the road in a position to receive the impact of the motor vehicle. As a result of this series of tests, the following conclusions were at that time drawn:

Impact depends largely upon the kind and condition of the tire.

Thin or worn solid rubber tires, even though they be very wide, produce very high impact forces.

Pneumatic tires offer the greatest influence in reducing impact forces, and with their use the impact increases only very slightly with the speed of the truck.

Cushion tires, that is, tires having a degree of softness and deflection between solids and pneumatics, offer corresponding advantages in reducing impact.

Impact increases with the speed of the truck, but it cannot be said to increase according to any constant ratio or power of the speed.

Although heavy unsprung weight may give higher impact than lighter unsprung weight, it cannot be said that this is the major controlling factor.

The relative destructive effect produced by light-weight, high-speed trucks and heavy, slow-moving trucks has not been determined by these tests. They do, however, indicate that equal impact may be obtained under some conditions.

Impact may be as high as 7 times the static load on one rear wheel when a solid-tired truck strikes a 1-inch obstruction at 16 miles per hour, an average value being about 4 times. For pneumatic tires the maximum impact value is probably not more than 1¾ times the load at one rear wheel, and an average value is not more than 1¼ times the load.

All cushion wheels do not reduce impact on the road surface, even though they may cushion the vehicle.

These tests, of course, were run with artificial obstructions and depressions in the road surface, and the question naturally arises: Are actual road surfaces likely to produce any such impacts as indicated by this series? To answer this question, impacts have been measured by the use of an accelerometer mounted on the rear axle in a position to measure the vertical deceleration of the unsprung portion of the vehicle in striking the road surface. The path taken by the hub of a motor truck wheel in striking the surface and the manner of calculation of the impact pressure have already been indicated.

FIGURE 3. THE PROFILOMETER USED ON THE BATES EXPERIMENTAL ROAD IN ILLINOIS

Tests were made by running different sizes of motor trucks over typical concrete roads and noting the maximum reading of the accelerometer. The unsprung and sprung weights of the vehicle and

the acceleration as determined from the accelerometer, being known, the impact pressures were then calculated, and it has been found that on typical concrete roads that have been in service up to four or five years considerable impact pressure can be developed. Tentatively, it can be stated that the maximum pressures to be expected under the rear wheels of the motor trucks are as follows:

2-ton	18,000 pounds
3-ton	24,000 "
5-ton	30,000 "

Additional tests are now under way which will throw more light on the accuracy of these figures. These pressures correspond reasonably well with the pressures found by the use of the copper cylinder measurements already mentioned, and correspond to heights of fall of the rear wheels well up to 2 inches, as determined in the old copper cylinder tests.

The Effect of Impact on the Stress in Concrete Roads

It would seem to follow that the higher the pressure created on a road surface, the higher should be the stresses created within the surface, and, in general, the more rapid should be the deterioration of the surface. Road materials differ very widely in their characteristics. Thus, concrete is perhaps the most elastic of the road surfaces in the sense that definite deformations are to be expected with definite increase in load. The bituminous surfaces behave more like a plastic material, the degree of plasticity changing with the temperature. Macadam, gravel and sandy-clay follow the laws which govern masses of granular materials, and they possess elasticity and plasticity to a very limited degree.

The nature of the effect of the impact of traffic produced by roughness in these different surfaces will therefore be different, depending upon the type of surface. Since concrete is of an elastic nature, it offers the possibility of making accurate measurements of stresses produced by traffic forces; the relative stress effect produced by different degrees of roughness can therefore be very accurately determined in a concrete road, and the stress produced furnishes a measure of the degree of destruction likely to result in the road surface.

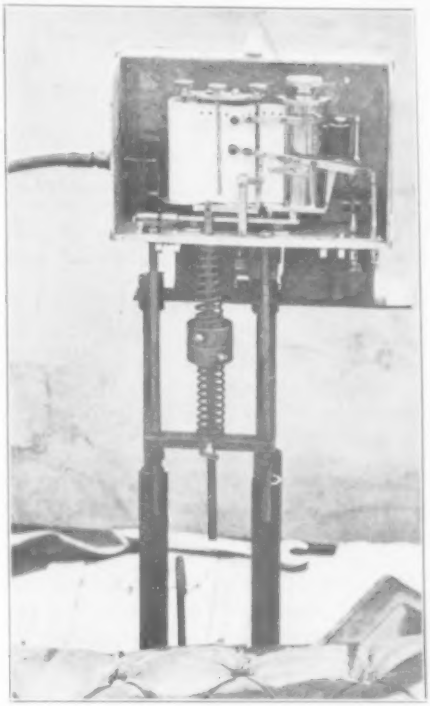


FIGURE 1. RECORDING ACCELEROMETER

Measurement of Fiber Stresses in Concrete Roads Produced by Impact of Motor Trucks

For measuring the stress or deformation in the road surface, recording strain gages were set along the edge and as close to the bottom of the slab as possible. A view of one of the instruments set in position on the underside of the slab is shown in Figure 2. Similar instruments were placed at the edges of pavement slabs 4, 6, 8 and 10 inches in thickness built for test purposes on several kinds of subgrade. A motor truck equipped with solid tires was then run at speeds of 2, 10, 15 and 20 miles per hour, with the center of the rear wheels 9 inches from the edges of the road. Over each position of the strain gage an obstruction was placed on the road, consisting of a metal plate 3 inches in width, with thicknesses of ⅛-, ¼-, ⅜-, and ½-inch for the different conditions of operation of the motor truck.

These tests showed that for a given speed the stress always increases as the

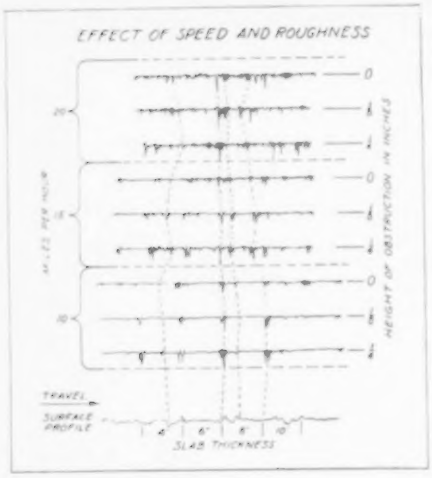


FIGURE 5. THE RECORD PRODUCED BY A RECORDING ACCELEROMETER

obstruction increases in height and, as might be expected, the effect is much more severe on the thinnest slabs. It is evident that the fiber deformations may be at least doubled when an obstruction of ½-inch occurs in a concrete road and the truck is caused to mount over that obstruction. Any condition which would make the truck wheel fall through the same distance would give very similar results. Apparently, for small roughnesses up to, say, ¼-inch, the increase in stress with speeds up to 15 miles per hour is quite small with all the thicknesses of slabs, but when the speed becomes higher than this, the stress curves show a rapid increase in stress as the speed increases. The ½-inch obstruction even at low speeds produces a very much higher stress than found in the smooth slab, and, moreover, the stress increases very rapidly with the speed.

In calculating stress it has been assumed that the modulus of elasticity of the concrete was 3,000,000 as determined in a static load test. It will be noted that the stresses obtained in this way in many cases exceed 700 or 800 pounds per square inch, the probable modulus of rupture of the concrete. The fact that no cracks are apparent in spite of this high stress needs more investigation to arrive at a satisfactory explanation.

According to investigations on the fatigue of concrete made at the Illinois State Highway Department laboratory, it seems that under repeated loads failure takes place under a comparatively few applications of loads producing a stress in excess of 50 per cent of the modulus of rupture. In the absence of more exact information on the relative stress at failure under impact and static loads, it would seem safest to accept half of the modulus of rupture as the safe unit stress produced dynamically as well as statically. If 800 pounds per square inch is the modulus of rupture of the concrete, the safe unit stress would then be 40 pounds per square inch; thus a 5,000-pound wheel load stressed the 4-inch slab beyond safe limits even when no artificial impact was produced. The 6-inch slab became unsafe with an ⅛-inch roughness at 20 miles per hour, and with a ¼-inch roughness at 10 miles per hour. The 8-inch slab began to receive an unsafe stress at 20 miles per hour with a ⅜-inch obstruction, and with a ½-inch obstruction at 10 miles per hour. The 10-inch slab was not overstressed with a ⅜-inch obstruction at 20 miles per hour, but with a ½-inch obstruction was overstressed at about 13 miles per hour. It is thus apparent that the deteriorating effect of roughness is different depending upon the thickness of the slab.

The effect of roughness on the deterioration of pavements of the bituminous type is a matter of common observation. Every one has observed the depression formed in the best types of asphalt pavements on the far side of manhole covers in city streets. The slight impact of traffic results in the production of impact pressure which the pavement cannot resist in its most plastic condition. Depressions in asphalt pavements resulting from any cause, whether from a local settlement, improper mixture or rolling, lead to impact with a resulting increasing roughness of the pavement and deterioration, whose progress will be rapid under heavy wheel loads and high temperatures.

The growth of washboard effects in gravel roads is known to be very rapid after a slight roughnesss once forms, and this growth may proceed from the formation of a single low spot which produces a succession of impacts of the vehicle wheels. Under average speed conditions the wheels land at approximately the same spots in the road, and on landing, the spinning

wheels displace some of the road surfacing material, thus forming the waves with crests of loosely compacted gravel and troughs with material in a well-compacted condition. The higher the waves, the harder the impact becomes and the faster the surface deteriorates. All of the evidence then points to the desirability of not only producing a smooth surface initially, but by maintenance measures keeping that surface as smooth as possible.

Devices for Measuring the Roughness of Roads

Within the last few years several devices have been proposed for obtaining a measure of the roughness of roads. One of these devices, developed by the Bureau of Public Roads and assembled by the Illinois State Highway Department, is shown in Figure 3. It consists of a frame which may be set up on the road surface in the position desired and which then serves as a smooth trackway over which is run an auxiliary truck upon which is mounted an autographic device for recording the movement of a tracer wheel bearing on the road surface. The tracer wheel is drawn from one end of the frame to the other. The frame is then transferred to another position and the record thus obtained.

A similar device using the same kind of automatic recorder has been used in experiments conducted by the Iowa State Highway Department. Both of these devices record the absolute roughness of the road. Still another device used by the Bureau of Public Roads is shown in Figure 4. It is mounted on a frame connected with the axle of a motor truck. A weight suspended between an upper and a lower spring serves to produce vertical motion of the recording pen as the entire apparatus follows the vertical motion of the axle of the vehicle. The recording drum is moved by means of the speedometer cable. This same type of recording apparatus may also be mounted in the body of the vehicle, and the vertical motion of the axle with respect to the body is then readily transferred to the recording apparatus. This device may also be fitted with an auxiliary attachment for accumulating the vertical motion of the axle. When this device is used, it is necessary, of course, that the vehicle be run at a constant speed and that the tires and springs be kept under uniform conditions. The record obtained does not give an absolute measure of the roughness, but does give a relative measure of the roughness, and the record of the vertical motion accumulating attachment gives an index figure which is indicative of the relative roughness of the various types of roads. Such a device was built by the Bureau of Public Roads several years ago and has since independently been made available in commercial form.

In Figure 5 are shown typical records obtained with the instrument shown in Figure 4. A 5-ton truck equipped with new solid tires was used in the test runs. A profile of the road obtained by precise levels at 6-inch intervals is plotted at the bottom. Each peak in the records indicates an impact due to roughness, and the higher the peak, the greater has been the blow struck by the truck wheel. In general, note that:

(1) Even a seemingly smooth road surface will have appreciable roughness.

(2) The higher the speed, the greater and the more frequent will be the impacts delivered to the surface by the trucks.

(3) The rougher the road, the greater are the impacts, as shown by the increased height of peaks with ⅛-inch and ¼-inch obstructions.

ACKNOWLEDGMENT.—From a paper delivered before the American Road Builders' Association, at Chicago, Ill., January 24, 1924.

Gases in Street Manholes

ATMOSPHERES in telephone manholes in Philadelphia have been examined for the presence of carbon monoxide by the Department of the Interior, acting through the Bureau of Mines. The Hoolamite detector and a newly devised bomb tester for explosive gases were used. The bomb is made of pipe fittings, spark plug, automobile spark coil and dry cells. Of 13 manholes in different parts of the city, suspected of being gaseous, 12 contained irrespirable atmospheres, and two of these were explosive. Eleven holes were tested at random and 8 showed dangerous quantities of carbon monoxide. Workmen at Philadelphia ventilate gaseous manholes before entering, with sails or a rotary hand-driven blower, similar to a blacksmith's forge blower. This safety measure affords adequate protection.

The Design and Operation of Sewage Pumping-Stations

By C. S. Timanus

Burns & McDonnell Engineering Company

WHILE the art of pumping water has been practiced for hundreds of years, the lifting of sewage by mechanical means was little used until comparatively a few years ago. The progress in the design of machinery for handling sewage began with the universal adoption of the water carriage system of sewage disposal and has since kept pace with the wide-spread demand for better sanitary conditions. There has been much discussion of the proper method of pumping sewage: first cost, reliability, economy of operation and sanitary features are the important topics of interest and discussion.

Reliability is, perhaps, the most important of these elements, while the sanitary features of a plant rank as a close second; indeed, the two elements are very intimately related. An unreliable plant may easily become the cause of unsanitary conditions and a nuisance. On the other hand, a plant may be dependable—always capable of handling all the inflowing sewage—but, nevertheless, a nuisance on account of unsanitary receiving wells, trash racks, or bar screens.

Secondary in importance to the reliability and sanitary features of a plant come its first cost and economy of operation. Theoretically, the allowable first cost depends on the economy of operation, and operating economy, in turn, depends on labor costs, power costs and maintenance charges, any one of which may become the controlling or dominating factor of the entire operating cost. Power costs are easily calculated, but labor costs and maintenance charges are more difficult to estimate and require experience and good judgment. It is the designing engineer's duty to consider such factors carefully and arrive at the true operating economy of the proposed plant.

Consideration of the general elements of design leads to the division of sewage pumping-stations into two general groups, which, for want of a better classification, may be designated as large stations and small stations. In general, stations handling in excess of 1,000 gallons per minute of sewage or storm water may be classified as large stations. These stations are characterized by large valves and water passages, large equipment and, where screens are necessary, by elaborate mechanism for cleaning screens and disposing of screenings. Trouble from stoppages is rare, because pumping equipment with large clearances and valve passages may easily be provided. Motor-driven centrifugal pumps are very often used, and in many cases stations are equipped with oil- or gas-engine-driven generators to provide emergency power. Excellent examples of large stations are the Calumet, Des Plaines and Evanston stations of the Chicago Sanitary District and the older stations at New Orleans.

Small stations—those pumping sanitary sewage and small quantities of storm water—are much more numerous than large plants, and because they are more often encountered in general design practice and because they offer problems as perplexing and as difficult of solution as the large stations, the detailed discussion is limited to stations of this type.

Determining Capacities

Before any station can be intelligently designed, careful preliminary investigations are necessary. If the station is to be located on an established system, actual gagings of the sewage flowing should, if possible, be made. Studies should be continued long enough to determine the daily maximum flows and the weekly maximums. A careful inspection of the system should be made and the number of roof connections and cellar drains discharging into the lines noted. If the lines are old, there is a possibility of ground water infiltration which may reach considerable proportions in wet weather. Low places where per-

forated manhole covers act as storm-water catch-basins should be investigated and recorded.

An attempt should be made to eliminate all unnecessary infiltration, roof water or storm flow. If this is impossible, pumping equipment must be provided to handle abnormal peak loads. Pumping unnecessary quantities of water only adds to the cost of operation and to the first cost of the station for equipment which is used only a part of the time. Where conditions are such as will permit, storm flows of approximately six times dry-weather flows may be by-passed around the station. This will depend, however, on whether there is a convenient point of discharge below the station and whether the discharge of such flows would be considered a nuisance.

Stations built to serve new districts where sewer-mains and laterals are installed coincident with the construction of the station should be designed to serve the ultimate future needs of the district. Additional equipment can be installed as the district grows. In such a district it is possible practically to eliminate the effect of storm-water periods by seeing that pipe joints are carefully made, that manholes are properly set, and that roof connections are not allowed. Grades of sewer-mains and laterals can be made steep enough to dispense with flush tanks. The normal flow may be estimated approximately 50 gallons per capita per day, or 250 to 300 gallons per sewer connection per day. Peak loads may be estimated at 175 to 200 per cent of normal flows.

Selection of Equipment

The capacity of the station having been determined, the next step is the selection of proper equipment. This cannot be done, however, without a clear understanding of the limitations of certain types of equipment when subjected to this kind of service. Very frequently flows as small as 100 to 500 gallons per minute are encountered in the design of these plants. Pumps designed to handle clear water in such small quantities usually have inlet and discharge openings of 2 to 4 inches, while the clearances through the impeller of centrifugal pumps or the valves of a plunger pump are much smaller. Experience indicates that clearances through any device for pumping sewage should not be less than 5, and preferably 6 inches, unless the equipment is protected by screens or trash racks of some sort. Self-cleaning screens are out of the question because of the cost, while small bar or wire screens are always a nuisance from the sanitary standpoint, and very often cannot be tolerated. The attention necessary to care for small bar or wire screens properly is large, and the consequent maintenance costs are abnormally high.

THE MILLER STREET SEWAGE EJECTOR STATION, FORT MADISON, IOWA

Sewage Ejectors

These limitations of the ordinary types of pumping equipment have led to the development of the pneumatic or air-lift systems using sewage ejectors, as they are commonly known. The sewage ejector is nothing more than a cast iron or sheet steel pot into which the sewage flows through large inlet pipes. When the pot is full, a float-operated valve is opened, admitting air under pressure on top of the sewage, which is thus forced out into the discharge main. Check valves on both the inlet and the outlet sides prevent backflows from the discharge main when the pot is filling and backflow into the inlet line when the pot is discharging. Air for the operation of the ejectors is supplied by means of air compressor units, which may be steam-, electric-motor- or gas-engine-driven. Usually on municipal installations, electric-motor drive is employed with gas-engine or gasoline-motor standby units provided.

Either horizontal or vertical compressors may be used. In the small sizes, air-cooled or hopper-cooled types may be had. For the larger sizes, circulating water must be employed.

Where compressors are electric-motor-driven, several types of motor may be used, operated through remote control apparatus actuated by pressure regulators connected to the air receiver. If the motor is less than 5 h. p., it may be thrown directly across the line by means of a magnetic switch. Where motors are thrown directly on the line, they should either be oversize or capable of exerting a large starting torque or starting effort. Otherwise, an unloader should be used on the compressor, which will allow the motor to come up to speed before receiving its load. For any type motor over 5 h. p., automatic starters, which allow the motors to come up to speed gradually, should be employed. Motors can be connected to compressors either by gearing, silent chain, or belt. Short-belt and idler-pulley drive is usually employed, although some types of chain drive are as flexible as the belt drive and as positive as gearing.

Ejector installations lend themselves to a number of housing schemes. The ejector pots themselves may be placed in underground wells or pits detached and even removed some distance from the compressor stations. It is perhaps best, however, even though more costly, to build the ejector pit inside the station proper. By this arrangement all the machinery is easily accessible and well-protected. It is highly inadvisable to house motor-driven compressor units in underground structures. In severe climates, some method of heating the station should be provided.

From the standpoint of first cost, the ejector type station is at a disadvantage when compared with a pumping-station employing centrifugal pumps and screens. It is difficult to give percentage comparisons, inasmuch as conditions of installations vary somewhat, but it is probably true that the ejector station will cost at least 25 per cent more than the station using centrifugal pumps. The cost of operating the ejector station will, however, in many cases compare very favorably with the pump-station. This is true in spite of the fact that the power costs are higher for the ejectors. The station efficiency of the ejector plant will be in the neighborhood of 25 to 30 per cent, while that of the pump-station will be between 40 and 55 per cent. The cost of an operator must, however, be charged against the pump station, while ejector stations, on the other hand, require very little attention other than the oiling of moving parts occasionally. One man may look after a number of the stations, or where there is only one station it is only necessary to delegate a man from some other city department to make the occasional inspections and oiling necessary. It is because of the fact that the ejector requires little care and attention, coupled with the fact that it possesses excellent sanitary features, that this type of sewage pumping-station has proved itself satisfactory.

Where it is necessary to handle quantities of sewage in excess of 500 gallons per minute, the ejector station, while still capable of the service, is not so well adapted as a centrifugal pump-station, using a centrifugal pump with large clearances through the pump. The vanes should be constructed in such a manner as to take up very little of the circumference of the impeller. There should be no sharp points or edges upon which trash, rags or paper can catch, and the curvature of the ends should tend to oust such rags or trash as might engage the vanes.

The Wood Trash Pump, which is of this type, is claimed to be able to allow the passage of a solid sphere of the next lower standard size than the pump; that is, an 8-inch pump will pass a 6-inch sphere, or anything which will flow around a 6-inch pipe elbow. These pumps are built in either horizontal or vertical types suitable for almost any type of drive. Motors are usually employed, however, and may be either direct current or alternating current. Several methods of control may be provided, but the most popular and the simplest is a float-operated switch actuating an automatic starter. The installation of these pumps is no different from that of any type of clear-water pump running automatically. A closed well should be provided and pumps so set as to remain always primed. No screens are necessary on plants equipped with these pumps in sizes larger than 6-inch, and, consequently, the station may be made entirely automatic, requiring no more attention than is required for the ejector station. The efficiency of the Wood Trash Pump is remarkable, approximating that of the ordinary clear-water pump. In the larger sizes a test efficiency of 76 per cent has been attained. The efficiency curve is flat, which offers an opportunity for a considerable variation in head without a large change in efficiency.

Recapitulation

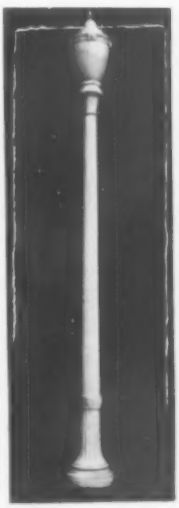
In recapitulation and conclusion, these points are emphasized: first, the designer of the small sewage pumping-station should be very careful in determining the capacity of the proposed station; second, he should pay special attention to the sanitary features of his plant; third, he should be fully aware of the limitations of ordinary clear-water pumping equipment when employed in this service; fourth, for flows under 500 gallons per minute no class of equipment is as satisfactory as the pneumatic sewage ejector; fifth, for flows of over 500 gallons per minute the Wood Trash Pump offers the best solution of the problem.

ACKNOWLEDGMENT.—From a paper read at the Fifth Annual Sewage Disposal Conference, Iowa State College, Ames, Iowa.

Hamilton Extends its Street-Lighting System

City of 40,000 Began Program Two Years Ago and Appreciates Value of Increased Illumination

ABOUT a year ago, the business men of Third Street, Hamilton, Ohio, organized as the Third Street Boosters' Association, began efforts to obtain improved lighting in their district. They made a canvass of the district and signed up nearly 100 per cent of the property owners, although only 87½ per cent were necessary. The cost of the improvement is about $10,000 and is assessed on the abutting property.



The new installation is composed of 50 Form 12 Novalux lighting units with medium flashed alabaster rippled glassware installed along Third Street between Dayton and Sycamore Streets. These units are equipped with 10,000-lumen (1,000-candlepower) Mazda lamps, with an IL transformer with detachable couplings on the primary in the base of each standard. The standards are spaced at intervals of 85 to 90 feet parallel, and the light source is 14½ feet above the sidewalk. A celebration, with addresses, band and orchestra music and dancing, took place when the lights were turned on in this new district.

The improvement in lighting has already brought more people to the street and increased the business of the stores and shops, enabling the merchants to keep pace with the stores on other

streets. As a result, the extension of the white way from Sycamore Street to Central Avenue, the latter being the main thoroughfare from Cincinnati, is contemplated, and legislation is under way for the authorization of a similar lighting installation on Second Street, where a campaign for the improvement has been started.

These successive steps in the improvement of the street lighting of the city began two years ago, when 750 carbon arc lamps, operated at 7.5 amperes, were removed and approximately 1,100 incandescent lamps on brackets were installed. The lamps varied from 250 to 1,000 candlepower. There were also installed about 850 Novalux units equipped with rippled glass globes with dome refractors for 400- to 1,000-candle-power high-current lamps. The 350 brackets were equipped with reflectors and some with refractors, in which 250-candle-power lamps were used. The old five-light clusters in use were removed and replaced with single-lamp standards with 300-watt multiple cluster units, the multiple system being used because of its economy. This represented a gain in substituting one light for five small and less efficient lamps in this particular class of lighting.

A large share of the credit for the improvement now under way should be given to James O'Toole, City Electrical Superintendent, who has been a constant advocate of, and worker for, better street lighting.

Oiled Earth Roads in Illinois

By James H. Reed

County Superintendent of Highways, Cambridge, Henry County, Ill.

OILED roads are comparatively new in Illinois and may be considered as still in the experimental or trial stage. Some twelve years ago road oil was in use in a number of places on village streets and country roads on a small scale. Great improvements resulted, and the demand for oiled roads increased until in 1923 not less than 40,000,000 gallons of oil was used on some 10,000 miles of roads and streets.

The writer does not regard the oiled road as a substitute for the hard road, but believes our main roads should be paved as rapidly as sound economics permit. Road oiling has attained such proportions and the improvements made thereby have been so great that the process merits careful consideration and investigation as a means of improving secondary roads.

How to Investigate Oiling Methods

The methods at present in use for constructing and maintaining oiled roads should be understood, the results obtained carefully noted, and costs accurately ascertained. The fundamental nature of the oil and the nature of the compounds, mixtures or emulsions formed when oil is applied on the road should be studied, for it would seem that such studies should lead to a better understanding of the properties, or qualities, to be striven for in the manufacture of road oil and of the best methods of using the product. The effects of different soils and slight climatic differences are to be taken into consideration, and, as far as may be, the limitations and possibilities of the process should be determined.

The usual methods of preparing the road and applying the oil are of common observation. The road is graded as early in the spring as the condition of the ground will permit. It is left open to traffic and is frequently dragged or gone over with some form of maintainer until the oil is applied, the object being to have the road settled and as evenly packed and smooth as possible when the oil is put on. The cross-section of an oiled road is important. A crown of 12 inches in a width of 24 feet has been found satisfactory on a road with considerable traffic.

Applying Oil

In Illinois, road oil is usually heated and applied with pressure oilers mounted on motor trucks, though light oils are sometimes successfully applied without heating. The most common form of distributing truck, or spreader, is that in which a ro-

tary pump forces the oil onto the road through spray nozzles. In this way, the oil is applied very uniformly. On country roads, different quantities of oil are used, 2,500 to 4,000 gallons per mile and ½- to ¾-gallon per square yard being common figures, with a tendency toward the use of more oil. The cost varies with the price of oil and the distance hauled, but in 1923 was often 6½ to 7 cents per gallon, including oil, freight and spreading. Maintenance is carried on, or attempted, with road drags, blade maintainers and similar apparatus.

The greater part of the road oil used in Illinois is applied on the earth roads of the central part of the state, little being used in those northern counties where gravel or rock is available for road building, and little going south of the black-soil belt. Within central Illinois great improvement in roads has resulted from the use of oil, although the degree of success attained has not always been everywhere the same.

THE OILED EXPERIMENTAL ROAD IN HENRY COUNTY, ILL., IMMEDIATELY AFTER A SIX-DAY RAIN, SHOWING EXCELLENT CONDITION OF SURFACE

Oiling a Great Improvement

The oiled roads are at nearly all times better than the unoiled. Except where the soil is light and except during long periods of hot, dry weather, the dust is kept down. Summer rains have little detrimental effect on an oiled road, and in the fall, when rains are frequent and evaporation is slow, the difference is often such that reports issued by automobile clubs on road conditions frequently contain such notes as: "Unoiled roads very muddy; oiled roads good; 90 per cent main roads oiled." "State Aid oiled earth roads in good condition, despite rains of last few days." "These three are oiled and in good shape at all times."

In the spring, oiled roads sometimes fail, and oiling will not cure "seep holes" which occasionally appear at that time on account of water in the subgrade. On the other hand, some counties report that oiled roads have carried a very considerable traffic uninterruptedly and satisfactorily throughout the entire year.

As pointing toward the limitations of oiling, it seems that oil does not increase the bearing power of the road above that of the compacted unoiled soil, nor does it form a mat, or oiled crust, or layer of earth mixed with oil, of sufficient strength, as a slab, to distribute wheel loads over any considerable area. At present, its possibilities seem to be those which would follow the formation of a surface which will not become dusty and which will shed water.

Studies of Oiling

As to what is being done in a study of the process, outside of the actual oiling of roads undertaken by many townships and counties, it may be said that the University of Illinois, the Illinois Division of Highways, certain of the counties and many of the large oil producers and refiners are

devoting a great deal of time and study to the subject, both in the laboratory and in the field.

Three experimental roads have been oiled, one at Urbana, by the University, under the charge of Professor W. M. Wilson; one near Rosemond, conducted by the State Division of Highways and Christian County jointly, and one near Cambridge, conducted by the state and Henry County. F. L. Sperry, Assistant Engineer of Materials of the Division of Highways, has been in immediate charge of the two last-named roads for the state. A number of the large oil companies have cooperated earnestly in this work, donating oil in some instances and assisting in every way possible through their engineers and chemists.

A brief description of the experimental road in Henry County will indicate the scope of the work undertaken. The road chosen for the experiment is typical of the most heavily traveled country roads of that part of the state, and throughout its length the soil is quite uniform. It is divided into 15 sections, each 1,000 feet long, and each section is oiled with a different kind or quantity of oil. On some sections, the total quantity was all applied the same day, and on others the same total quantity was used, but was applied at two or three different times during the season.

The road oils available here are usually residuums resulting from the distillation of crude petroleum. In some instances, a heavy residuum is "cut back" with a lighter oil, and sometimes different residuums are blended. By different kinds of oil is meant distinct types, distinguished by the source, or field, supplying the crude oil from which the road oil is made, or by the process of refining, and all the various types supplied commercially in Illinois have been used in these experiments.

The experiments in Henry County have been in progress during the last six months only, and it is felt that definite conclusions as to the best kinds of oil for the purpose and the best methods of construction should not be drawn from these experiments before the road has at least gone through the trying conditions of spring, especially as the comparative condition of the several sections changes rapidly and continually. However, many interesting, and sometimes unsuspected, facts have been observed which appear to be factors in the success of an oiled road, and certain things seem fairly well established: for instance, it seems likely that ¾ of a gallon per square yard is the minimum that can be depended on through the year, and much better results have been obtained when the entire quantity was not applied all in the spring, but part was reserved until late in the summer.

It is planned to continue the experimental roads in 1924, with the work of the University, the Division of Highways and the counties concerned carefully coordinated. And it is the hope of those connected with the work that information will be obtained which, added to the experience accumulating in oiling, will lead to a determination of the proper field for this method of road improvement and to the economical construction, within that field, of good and dependable oiled roads.

ACKNOWLEDGMENT.—From a paper read before the Illinois Society of Engineers.

May Day for Child Health

THAT May Day may become generally accepted as the day of auditing the child health situation in American communities is the hope of the American Child Health Association in fostering the idea of making May 1 Child Health Day.

Although infant mortality in the United States has been reduced by half during the last twenty years, the fact that we are sixth among the nations of the world in childhood deaths shows that much remains to be done. That this country is seventeenth as to losses of mothers in childbirth is nothing short of a national scandal.

The situation demands fuller support of public health officers and the recommendations of other capable medical and sanitary advisors in the matters of nutrition, housing, nursing, ventilation, clothing, exercise, rest and the other elements which make the total well-being of the individual. To bring about this support, an awakened public conscience is necessary. So May Day will be made an occasion to emphasize that child health is not a matter for the professionals alone, but that it is the concern of every citizen. Organizations desiring to cooperate in carrying out this plan can obtain helpful suggestions from the American Child Health Association, at 370 Seventh Avenue, New York.

How Should Hydrant Rentals be Charged in a Municipal Plant?

By W. C. Brockway

Taxpayers' League of St. Louis County, Inc., Duluth, Minn.

THE state constitution of Minnesota, according to Article IX, exempts from taxation "public property used exclusively for any public purpose." The courts have construed this to include city-owned public utilities. Further, the consensus of public utility rulings considers the municipal water department as a separate entity, distinct from other functions of government and required to finance its own operations, according to a statement of Caleb M. Saville, Manager and Chief Engineer, Board of Water Commissioners, Hartford, Conn.

Who Pays for Fire Protection?

The payment of fire protection service involves two issues:

1. Shall the burden be placed on consumers by including the cost of this service in the water-rates?

2. Shall property be charged in proportion to the value of the fire protection received?

Quoting Caleb M. Saville further:

"While the actual increase would be small if the cost of fire protection were placed on consumers, because of being so widely distributed, yet its imposition has by public utility commissions been held unfair, inequitable and discriminatory. The fallacy and inequality of putting the cost of fire protection on private consumers is evident when it is considered that oftentimes high-value buildings use so little water that their contribution to the cost of fire protection based on rate payments would be negligible compared with the amounts paid by low-value buildings using large quantities of water. The most equitable method for defraying the cost of fire protection benefit is its inclusion in the general tax laid against property." (*Engineering News-Record*, May 17 1923.)

When fire protection is paid for out of the water rents, tenants pay for the fire protection of the landlord, who may not pay for any water service whatever. Amounts paid for fire protection service never amount to more than a small fraction of the value of such service to the community, nor is it contended that they should. Equity does demand, however, that the property protected by fire-hydrants should pay the full cost of rendering such protection.

When water consumers pay the cost of fire protection service in the water-rates, it is found that some industries pay several hundred per cent more for the fire protection service rendered by the water department per thousand dollars of assessed valuation than any other groups of property owners. In Duluth, laundries pay in water-rates approximately $39 per $1,000 of assessed valuation, whereas the wholesale houses pay only $1.88.

The Fundamental Principles Involved

The fundamental principles involved in this discussion are the status of water departments as to payment for services rendered, and the question of taxation. There is also the question of equity, as to whether consumers shall bear the burden by reason of increased water-rates, or whether property shall be assessed in proportion to the value received. The first point which must be considered is fire insurance rates and water-supply, as regards the value of fire protection in dollars and cents.

RELATION BETWEEN WATER RENTS AND PROPERTY VALUES, DULUTH, MINN., 1922

Classification	Assessed Valuation of Property	Amount Paid for Water	Amount Paid for Water Per Year Per $1,000 Assessed Valuation
Laundries	$95,400	$3,751.08	$39.40
Manufacturing plants	990,900	6,986.27	7.05
Apartments, hotels	181,100	2,593.19	14.30
Department stores	999,700	1,782.62	1.78
Office buildings	621,400	3,867.08	6.22
Wholesale houses	2,596,500	4,838.90	1.86
Private houses	111,100	196.90	1.77
Grand totals and average	5,596,100	24,016.04	4.30

If fire protection costs were paid from the general tax fund, property would pay in proportion to its assessed valuation for value received. If the city paid the water department for fire protection services, the money would come from general taxation, so that each property owner would pay a part of this charge in proportion to the assessed valuation of his property. On the other hand, if the city does not pay for this charge, it must be paid for out of the water rentals, in which case the industry using the largest amount of water will pay the largest portion of the fire protection cost, irrespective of the valuation of the property of the large users.

If water rents absorb the fire protection charge, the basis for payment is the amount of water used, and not assessed valuation. As to fire protection service, the actual service rendered to the individual certainly depends upon the value of his property and not upon the amount of water he consumes.

Fire Insurance Rates and Water-Supply

Basic rates for fire insurance depend upon the water-supply, fire department, streets, police department, general weather conditions, and building code. The individual risk depends upon construction, occupancy, hazards, exposure, fire protection devices, and the general tone of management. A better alternative than water for fire protection on a large scale does not exist. Water is necessary for fire protection to such an extent that it requires no comment.

According to George W. Booth, Chief Engineer of the National Board of Fire Underwriters, "the relative classification of cities is graded on a scheme in which there is a total of 5,000 points of deficiency between a place having the best of protection and one without any."

These deficiencies are made up as follows:

Water supply	1,700	34%
Fire department	1,500	30 "
Fire alarm	550	11 "
Police	50	1 "
Building laws and their enforcement.	200	4 "
Laws in regard to hazards and their enforcement	300	6 "
Actual structural conditions in the mercantile district	700	14 "
	5,000	100 "

Determination of Charges for Fire Protection Service

A composite charge consisting of a unit charge per hydrant for maintenance and depreciation plus another unit charge for pipe capacity and other costs incident to fire protection, seems to be the method most favored by public utility commissions in determining the proper charges for fire protection service by water-works.

Fire-hydrant rentals do not represent generally the cost of rendering fire protection service. When the cost is placed on this basis, there may be a tendency to discourage the installation of the proper number of hydrants in order to keep down the fire protection charge. In the case of city-owned plants, the fire protection revenue is rarely commensurate with the cost of service. This revenue should lie somewhere between the cost of the fire protection plant and the value of the service to the city. No constant economic relation exists between hydrant rentals in the narrow sense and taxation, so it is unsound to let one item balance the other.

Maintaining Pavement Between Street Railway Tracks in Hartford, Conn.

IN accordance with an act of the Connecticut Legislature of 1921, the work of maintaining the pavement of the area in and between the tracks and 2 feet outside the outer rail, cuts made for repairs to rails excluded, formerly assumed by The Connecticut Company, the local street railway utility, now devolves upon the city. Of the former railroad area described above, the Connecticut Company is now compelled by law to pay for repairs only in the area bounded by lines 8 inches outside of the outer edge of each rail, or a strip approximately 22 inches wide along each rail.

An accurate record was kept of repairs in these strips and the costs billed monthly by the Hartford Street Department to the Connecticut Company. The total of these bills was $4,853.92, covering 2,065.5 square yards of asphalt. As a matter of record, detailed accounts were kept of repairs in the area formerly paid for by the Connecticut Company, but for which the city must now pay. It is interesting to note that this total was 2,032.47 square yards, costing $4,776.30.

New Subdividing Methods on an Indiana Town Site

IN a booklet on the new town site of Woodmar in Hammond, Ind., Roscoe E. Woods, President and Director of the project, makes this statement to his colleagues:

"Cities are not built for a day nor for a lifetime, but to last until the end of time. The buildings may fall into decay, but the streets remain for the most part unchanged. The mark of your handiwork as a builder will be indelible. Time and changed conditions may slightly alter what you do; but the impress of your plans will still be unmistakable. The streets which you now dedicate to public use will soon be astir with a thousand activities, and the foresight which you display in planning them will add to the serenity of life, and detract from the confusion of this urban existence. A town site is a setting in which life's dramas are enacted. In planning this city you are doing something of which you, your children, and your children's children may be proud. No matter what the pecuniary reward may be, it will not compare in satisfaction with that you will receive in the knowledge that you have built this city as well as you knew how."

This is the point of view which appears to have controlled the planning of this new town, which covers an area of nearly 600 acres and will support a population of over 10,000 people.

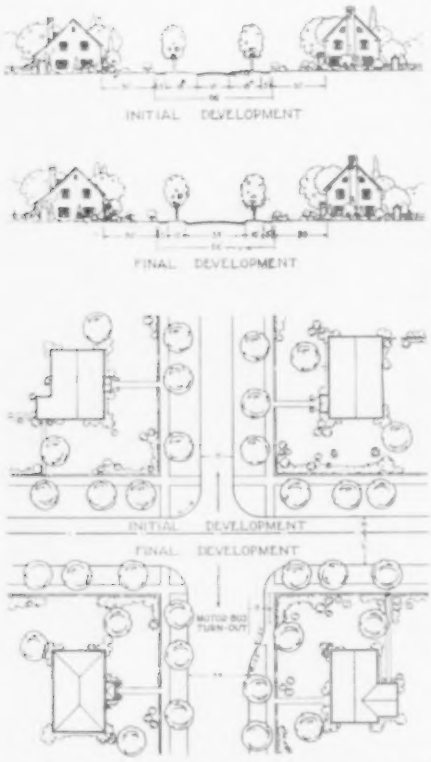
The plan includes an eighteen-hole golf course with the club-house looking down from a terrace over a broad, wedge-shaped field on which the course is laid out, utilizing the Little Calumet River for a number of water hazards and also for a closure to frame the view. For schools and school playgrounds two entire blocks conveniently located are set aside. The street system is laid out to provide for large increase in automobile traffic and for automobile parking space, and the streets are being developed progressively. These features are interesting and valuable, but not new.

The fact that Woodmar straddles a main radial thoroughfare running south from the great Calumet steel district and that consequently the flow of traffic will be largely due north and south, and east and west, dictated a system of streets on the rectangular plan. The existing main highways confirmed this type of plan and, in fact, made it impossible to vary greatly from the rectangular system, even if that had been desirable. One diagonal thoroughfare following the railroad is provided for motor truck and motor bus transportation along that particular line.

THE TOWN SITE OF WOODMAR, IND.

1. Playgrounds within residential blocks, where the little children can play safely. These playgrounds are 50 feet wide and 400 feet long. 2. Each school and school playground occupy one entire block. 3. Parkway and boulevard through the entire length of the town. 4. Business street. Business activity is confined to this street (108 feet wide), the north border street, and the frontage across from the railway station. 5. Motor bus and motor truck thoroughfare to and from Chicago. 6. Aeroplane landing field. 7. Golf course (Woodmar Golf Club)

For this plan and those on the next page, THE AMERICAN CITY *is indebted to Jacob L. Crane, Jr., of Chicago, engineer of the project.*



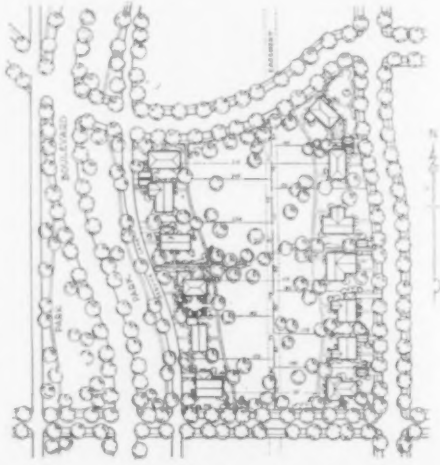
PLAN OF TYPICAL RESIDENTIAL STREET IN WOODMAR, SHOWING MOTOR BUS TURNOUT AND PROGRESSIVE STREET DEVELOPMENT

While the general plan does not seem unusual, a number of new features will add interest and attractiveness to the development. First, there are two drives extending through the entire project. The parkways along these drives vary from 150 to 350 feet in width. Every opportunity is taken to vary the direction of a street enough to close the view and to give some interest and charm to the arrangement.

Playgrounds located within residential blocks are proposed in nine instances. The illustrations show the arrangement of these interior playgrounds. They are 50 feet wide and 400 feet long over-all, and it is proposed to divide each one into two sections, one enclosed with a fence and planted with shrubbery and trees, to be used by the mothers and little tots, and the other to be left open as a boys' playground.

Five blocks are so arranged that the houses can face inward on a small private interior park. This arrangement frankly considers that nowadays the street has become a service way more or less dangerous and noisy, from which fact it is argued that the service side of a house should face the street and the front should face an interior park.

Motor bus landing places and also motor bus terminals are definitely proposed in the plan. The turnouts for landing places are shown in one of the illustrations as a further consideration of contemporary tendencies in transportation. And an aeroplane landing field has been located on a tract of flat



PLAN OF BLOCK IN WOODMAR, SHOWING SUGGESTED INTERIOR PARK ARRANGEMENT

ground fairly convenient to the other centers of transportation for purposes of interchange.

The whole tract has been zoned, and each piece of property will be sold under definite restrictions regarding the use, setback, yards, height of buildings and cost of buildings.

LONG-DISTANCE THINKING

The great lesson we can learn from European cities is the wisdom of thinking in terms of generations, rather than in terms of months and years in the planning of a city. Almost every civic undertaking of consequence takes many years in accomplishment. —J. C. NICHOLS.

Modern Street Lighting

By C. F. Lambert

Burns & McDonnell Engineering Co., Kansas City, Mo.

THERE are, generally speaking, two methods of street illumination: first, the high-intensity lighting found in business sections of cities which require an illumination sufficient to enable a large and fast-moving volume of traffic to be handled without accident; second, low-intensity and uneven lighting, as found in residence sections where objects, vehicles, etc., are seen in silhouette, usually as dark outlines against an illuminated street surface. As these streets are frequently lined with trees, it is necessary to place lights low to avoid the foliage. Therefore, residence streets are generally lighted to better advantage with low-power lights at fairly close intervals than by high-power lamps at street intersections only. Generally, about three-fourths of the total length of streets in a city falls within this class. The still further outlying districts require merely a line of lights to indicate the way for travelers, and no effort is made for direct illumination.

SUPER WHITE WAY FOR BUSINESS SECTION

The many factors entering into the problem of street lighting require many compromises in attaining the final result. The desirability of a uniform design throughout a city should not be overlooked, especially in the lighting of a long thoroughfare which may extend from a business center to the outskirts. In such a case it may be necessary to sacrifice the requirements of certain sections, to some extent, to produce the proper effect for the whole.

Local conditions govern, to a large extent, the requirements for laying out a street-lighting installation, and no definite rules can be made covering all cases. The amount of distribution of the light, the size of unit to be employed, and the height and spacing of the lamps are all corelated and must be considered with other factors. Where there is no foliage, lamps should be placed well above the ground, so that the maximum illumination may be obtained at distant points. Care must be exercised, however, that the lamps are not mounted too high, as the uniformity would be gained at a sacrifice of intensity. The limiting factor for height and spacing is the amount of light obtained midway between the light sources.

When pendant or hanger types of units are used along the curb, lamps up to 100 candle-power should be mounted from 15 to 18 feet high, depending somewhat on the light distribution. The higher candle-power sizes, that is, 400, 600 and 1,000 candle-power, should be suspended at a height of from 20 to 25 feet. The spacing depends upon the uniformity of the illumination desired, and should seldom be greater than ten times the mounting height.

For wide streets, lamps placed opposite one another will present the neatest appearance. The staggered arrangement of lamps is sometimes advantageous in giving a uniform illumination, but will not be so attractive in appearance as lamps placed directly opposite each other. The arrangement of poles on one side of a narrow street is often very effective and economi-

cal, and is especially applicable to the lighting of parkways and suburban or residence streets. This arrangement is not suitable, however, for commercial streets.

In the low-intensity lighting it is important that lamps be located at all street intersections; but with ornamental post systems, it is not desirable to place lamps directly on the corner, as the glare from such a lamp will tend to blind the driver who is about to turn the corner and wishes to see if the way be clear. Care should be taken in any street lighting that the lamps appear in a continuous line, as any irregular placing of lights will detract greatly from the effect.

Proper Diffusion Essential

No definite figures have been generally accepted for determining the intensities of illumination most desired, and methods of comparing intensities of illumination of different types of light have not been standardized. The final determination of intensity for street lighting depends upon the cost and many other factors, such as the surroundings and other local conditions. Comparisons of practice in various sections and cities are useful in this connection. For similar units, such comparisons may be made in watts per running foot of street; otherwise, illumination or candle-power value of the same order may be utilized.

The proper diffusion of light by means of diffusing globes and refractors is important in reducing the glare from bright light sources coming directly in the range of vision, and also eliminates the deep shadows. This is becoming of greater importance every day, because of the increasing brilliancy of modern illumination. The appearance of a light source is also greatly improved by the use of such equipment.

There are many different types of street lighting, including both high and low candle-power pendant units, suspended from brackets or span wires, and ornamental post lighting with lamps of both high and low candle-power. The system of energy supply to the lamps may be either multiple or series. Both systems can be installed underground or overhead. Of course, the greatest number of systems in this country are operated on the overhead series system.

The cost of installation and operation of street-lighting systems is governed entirely by local conditions, and one is quite liable to be led to wrong conclusions if comparison is made of the prices charged in different cities, without a full knowledge of the local situation.

Sizes of series lamps available for street lighting vary from 32 candle-power to 1,000 candle-power for use on a 6.6- to 7.5-ampere alternating-current circuit. As the lamps of high candle-power can be operated more economically at high currents, the units for the larger lamps are usually equipped with compensators or transformers. This permits their use in series with the smaller lamps.

Much skill has been shown in lighting of roads and highways. These are now being lighted by equipment which collects the rays and throws them up and down the road where needed. These units are mounted 30 to 35 feet above the road, and the glare which might naturally be expected to result is not apparent. The illumination of 250-candle-power units is excellent when placed 300 feet apart, and the lighting is good at even twice that distance. At the intersections of highways, high-powered flood-lighting projectors are sometimes installed. They must be installed so that no glare reaches the motorists.

RESIDENCE STREET LIGHTING

For outlying residence districts, 40- to 100-candle-power lamps are popular, and their height and spacing are adjusted to meet the conditions. For the main residential section, the lighting should be

somewhat increased, and lamps of 100- to 400-candle-power are utilized. A general plane of illumination comparable with that of bright moonlight and ranging from 1/20-foot-candle to half or third of that amount is usually sufficient.

PARK LIGHTING

Summer resorts and cities having a high seasonal percentage of transient population require a highly ornamental type of residential street-lighting fixture. This can be arranged so that a distinctive ornamental system may be had four months in the year and an adequate and economical system the rest of the time.

In the main business section, the art of street lighting has been most fully developed. Here the plane of illumination should be carried near to 1/10-foot-candle, ranging perhaps from half of this amount at the darkest spots to at least double near the lamp. The most important streets and public places ought to have an average of a good ¼-foot-candle, giving light enough to read a note-book. Such lighting ought to be furnished in places out-of-doors where the public gather at night, and in streets where the traffic is dense or the requirements for policing exceptionally severe.

In order to obtain the greatest usefulness and the most brilliant results along a business street, most of the lights should be cut off from vainly trying to illuminate the sky. The buildings along the street should be well lighted from the street lamps, and the street surface should be sufficiently illuminated to permit traffic to see clearly. Powerful arcs or large incandescent lamps placed fairly high, 18 to 20 feet, and spaced at a distance not over four or five times their height are very effective in securing these results.

In selecting the design of a standard for street lighting, local features and historic tradition can often be utilized. For instance, Los Angeles, Calif., has adopted a style suggesting the Spanish Renaissance. Riverside, Calif., has accentuated the mission features of her spirit by installing a rough concrete post in the form of a chapel bell tower with three mission bells hung in a triangle, and a cross at the top of the design. The requirements of cities which are far from the source of supply of standard globes can be met with the lantern type of unit.

Thus, in modern street lighting the work of the architect and artist keeps pace with that of the electrical and illuminating engineer, so that every city may acquire a lighting system which will be adequate for the illumination required, and will be the joy and pride of the entire community.

ACKNOWLEDGMENT.—From a paper read before the Indiana League of Municipalities.

Oakland County, Mich., to Duplicate Ideal Section of Lincoln Highway

OAKLAND COUNTY, Mich., is going to provide a road between Pontiac and Detroit, Mich., which in many respects will be two Lincoln Highway Ideal Sections side by side. This 32-mile road, to be constructed by the state and the county, will have a right of way of 200 feet and will consist of two 40-foot concrete pavements, separated by a 44-foot space, in which the interurban line will run. High curbs will separate the interurban tracks from the two automobile highways, each of which will carry one-way traffic. Outside of each 40-foot pavement will be a gravel shoulder 38 feet wide. These shoulders, roads in themselves, will be provided for the use of slow-moving vehicles and for parking purposes; thus 78 feet of width will be provided for travel in each direction.

An Outline of the Causes of Waves in Asphalt Pavements

By Prevost Hubbard

Chemical Engineer, The Asphalt Association

WAVINESS is not an inherent characteristic of asphalt pavements, as evidenced by millions of square yards of satisfactory surfaces varying from one to forty years or more in age and subjected to all conceivable conditions of exposure and traffic. The formation of waves, particularly in pavements of the fine aggregate type, does, however, occur to a sufficient extent to warrant a thorough investigation of the subject, with the idea of securing data that will enable highway engineers to prevent such defects in future construction. Such an investigation has recently been undertaken by the U. S. Bureau of Public Roads in cooperation with the Asphalt Association and the cities of New York, Philadelphia, Baltimore, Washington and Detroit.

Traffic is, of course, the most direct cause of wave formation, the thrust of vehicle wheels tending to rearrange the mineral particles of the paving mixture from the surface down. Under certain conditions, the mixture is, therefore, shoved into humps or waves, usually at a right angle to the direction of traffic, although at curves and intersections waves due to the side-thrust of vehicles are sometimes noted. When the pavement is sufficiently wide to allow two well-defined lines of traffic, transverse waves are most prevalent near the gutter, where most of the horse-drawn and other slow-moving vehicles travel. Even on comparatively narrow pavements waves seldom extend entirely across the surface. While it is probably true that the impact of fast-moving traffic accelerates wave formation, once started, or may be directly responsible where irregularities in contour first exist, slow-moving heavily loaded vehicles are believed to be the chief cause.

There are a number of conditions that tend to promote wave formation which are being given careful consideration in the government investigation. These are as follows:

Foundation Faults

Lack of support from below, causing local settlement of the foundation

Uneven contour in formation, causing variable thickness of asphalt paving mixture and consequent differences in compression

Very smooth foundation, which may promote slipping of the asphalt paving mixture over its surface

Inferior Paving Mixture

Use of too soft an asphalt cement for the climate, the traffic, or the grading of the mineral aggregate

Use of too much asphalt cement in the paving mixture

Poor grading of mineral aggregate, which creates instability of the paving mixture irrespective of the consistency and percentage of asphalt cement with which it is mixed.

Use of an excess of rounded particles of mineral aggregate in the paving mixture

Construction Faults

Uneven contour due to faulty spreading, raking or rolling of the paving mixture during construction, or to lack of uniformity in the composition of the paving mixture

Lack of proper initial compression during construction, which may be due to use of too light a roller, too little rolling, to the mixture's being too cold when rolled, or too great thickness of course for a single rolling operation

Faulty repairs to service openings

Exterior Causes

Absorption of an excess of oil or gasoline drippings, causing undue softening of the asphalt cement

Gas leaks from mains below the pavement structure, causing undue softening of the asphalt cement

ACKNOWLEDGMENT.—From a report presented at the International Road Congress, Seville, Spain.

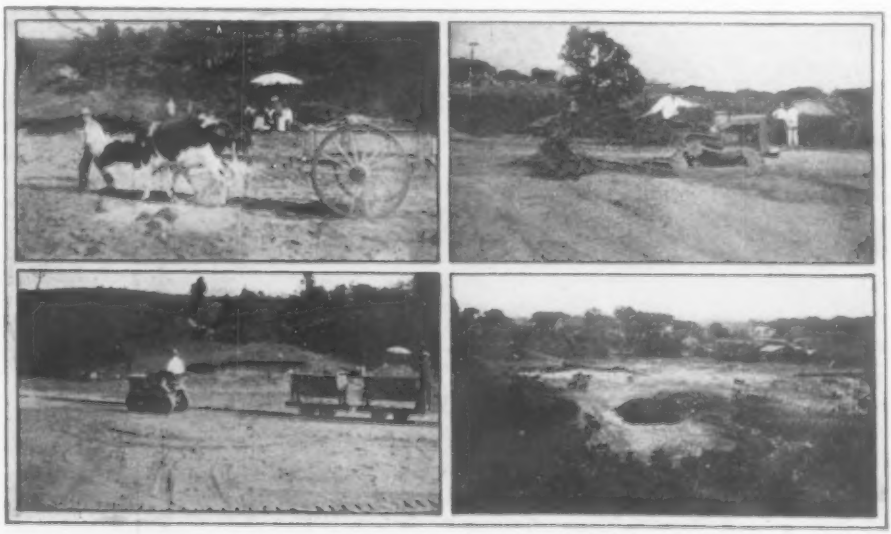
Forward Steps in City and County

How a Little Town Is Securing a Community Playground

KINGSTON, MASS.—A remarkable piece of community work, in the form of a playground movement, was started last year in Kingston. This small New England town, situated on the main highway from Boston to the summer resorts of Cape Cod, has, like other country towns, suffered in recent years from the increasingly heavy automobile traffic during the summer months. It has consequently felt the great need for a safe play place for the children of the community. But the local tax rate had reached its limit, and no town funds were available for the establishment of a playground.

The question was finally discussed at a meeting of the Kingston Board of Trade, and a committee was appointed to look into the matter. This committee, seeking to arouse the interest of the people in general, called for a representative of each local organization to join in forming a Playground Association. A suitable site, comprising nine acres in the center of the town, was selected, a survey made and plans distributed among the citizens. Contributions were then pledged for the purchase of the property and the establishmnt of a playground fund. The next steps were the appointment of a Park Commission by the Selectmen and the subsequent hiring by the Commission of a superintendent and a small gang of men to carry on the work.

On April 27 of last year the first sod was turned by one of the Selectmen and work began in a small way with wheelbarrows and shovels. A shallow, marshy pond of two acres had to be filled and the filling taken from the surrounding land. When the project is completed there will be about six acres of graded land at the base of a slope forty feet high extending along one side of the field. This slope will furnish ideal seating space for games in summer time, and toboggan slides, coasts and ski jumps in winter. Two baseball diamonds, a running track, a football field and two tennis courts are included in the plans, and



OXEN AND TRACTORS, MEN AND BOYS, WORKED TOGETHER IN GRADING KINGSTON'S COMMUNITY PLAYGROUND

a part of the field will be flooded for skating in the winter.

As the work progressed, interest in the project increased, and some people loaned teams and tractors to assist in the job. During the long summer evenings it was not an uncommon sight to see a hundred men and boys, from all walks of life, working side by side on this community task. A Volunteer Day was called for June 16, and over 300 responded. It was indeed interesting to see the double and single horse teams, yokes of oxen, and men with wheelbarrows, competing with the modern tractors. The women of the town did their part by serving a luncheon at noon and refreshments during the afternoon to the workers. In August a town fair was held on the grounds, and this added over $1,500 to the fund.

Work ceased for the winter on November 26, with the job about two-thirds completed, and will be resumed this spring. The Commission hopes to have the grading finished before the second annual town fair next August.

Wayne County Plants Many Trees

WAYNE COUNTY, MICH.—The past year was the most successful tree-planting season the Wayne County (Michigan) Road Commissioners have had. Particularly adapted to tree planting, the season gave the Commission an opportunity to complete its entire program for the year.

Two thousand select trees, 2½ to 3 inches caliper and from 12 to 20 feet in height, have been planted. These are mostly American elms and sugar maples, with a few Norway maples. The latter were planted through the village of Plymouth on the Canton Center road; the other types on Warren Road.

To date there are approximately 60 miles of improved roads planted to trees. These trees are placed 32 feet from the road center, which allows ample room for future pavement widening. The distance between the trees varies from 60 to 80 feet, depending on varieties planted.

In some localities, as on Telegraph Road, informal planting has been carried out. This system of planting, which is simply the spacing of trees irregularly, has been followed on roads passing through rather rolling country and is practiced to break up the monotony of a continuous row of trees uniformly planted.

All fences are being moved back to the property line, which in most cases is 33 feet from the center of the road, giving room to plant and care for the trees. After the trees have been properly pruned and planted, they receive efficient maintenance of watering, cultivating and mulching until they become well established. Spraying in season is also practiced, so that the trees are kept free from injurious insects at all times.

To date there have been planted approximately 8,000 trees. With this number of trees planted, the loss has amounted to about 7 per cent. All dead trees are immediately replaced at the next planting season. The proposed planting for 1924 includes about 20 additional miles, using some 2,500 trees. Besides the trees planted on the roads, about 1,200 have been planted in the county parks and along the roads adjacent to the parks. Approximately 6,000 shrubs have also been set out in the parks. These consist of about 50 species, mostly of native varieties, and were used for screens, building supports and general landscape effects.

As the parks are developed, more shrubs and trees will be necessary to complete the proper landscape. Trees must be planted each year to replace the old ones which die out.

LEROY C. SMITH,
Engineer-Manager, Board of Road Commissioners.

Model Home Provides Convention Fund

ENID, OKLA.—A novel plan of raising a convention entertainment fund, and at the same time encouraging the building of better homes, has been successfully worked out by the Enid Realty Board. When it was decided over a year ago that the 1923 convention of the Oklahoma State Association of Real Estate Boards would be held in Enid, the local realtors evolved the plan of building a model home to be used, first of all, for demonstration purposes and then sold, the proceeds to defray the convention entertainment expenses. A building committee of the Realty Board was appointed and plans for the house were promptly drawn up. The members of the Board each donated $50 to enable work on the building to be started, and an appeal for cooperation was sent out to local firms and

labor unions. The splendid response to this call for help was beyond expectation, and gave evidence of the fine spirit of good citizenship existing in the community. All the materials used in the construction of the home were furnished at less than cost price by the various business houses, and members of the local labor unions each donated a day's work toward the erection of the house.

THE MODEL HOME IN ENID, OKLA.

The model home is a six-room brick-veneer bungalow, built and furnished along the most modern and attractive lines. When completed, it was opened to the public for 30 days, and it is estimated that about 10,000 visitors inspected the building and its furnishings. The home was also visited by those attending the state convention of real estate boards and the Enid realtors were highly commended on the perfection of the building in every detail.

E. M. DEMPSEY, Acting President,
Enid Realty Board.

Labor-Saving Methods Adopted by Cook County Commissioners

CHICAGO, ILL.—Rearrangement of the departmental organization, installation of labor-saving equipment, and changes in methods of conducting certain activities, are outstanding measures already undertaken in Cook County following the recent efficiency and economy survey. Major accomplishments already effected in the use of labor-saving equipment include:

A reduction in extra and overtime salary expenditures from $965,000 in 1922 and $1,122,000 in 1923 to an appropriation of $532,000 for 1924, by doing away with long-hand writing extensive records in the four tax departments, this being made possible by the installation of labor-saving equipments costing approximately $225,000.

Installation of a uniform timekeeping and central pay-roll addressograph system for all county departments and institutions.

Provision for the installation of photographic equipment for making permanent records of instruments filed in the Recorder's office, resulting in improved services and estimated salary savings of approximately $200,000 each year hereafter.

Installation of photographic and dictating equipment for writing permanent and certified records in the offices of the Clerks of the Courts, resulting in improved services and future salary savings estimated at $60,000 per annum.

Installation and use of bookkeeping and billing machines in the Comptroller's Office, providing for improved, up-to-date accounting and financial records.

Installation of mail sealing and canceling machine and provision for central despatching of county outgoing mail.

Funds for further improvement in organization and methods, and for the enlargement and extension of county services, are provided in the 1924 budget.

J. L. JACOBS.

Sanitary Sewer for Small City Financed by Short-Term Improvement Bonds

MT. PLEASANT, MICH.—The practice of financing municipal improvements by the issuance of short-term bonds has been adopted by the city of Mt. Pleasant, and so far the method has proved to be a very satisfactory and economical one.

A typical example of what has been accomplished in this way may be seen in the installation of a sanitary sewer undertaken during the summer of last year. The cost of this particular improvement, estimated at $5,000, was levied against the properties benefited, the assessment to be paid in five yearly installments of $1,000 each. The first payment came due on June 1, 1923. The city therefore required an additional $4,000 to completely cover the cost of the work to be done. To provide for this, four bond issues in the sum of $1,000 each, maturing respectively in one, two, three and four years, were floated. To make the investment an attractive one, an interest rate of six per cent was offered, and the bonds were sold by the City Clerk within a short time.

If when such short-term bonds are issued there happens to be a surplus in any of the city's several funds, such as the sinking fund or saving fund, the city itself purchases some of the bonds, and in this way a saving is of course effected.

If the cost of the improvement is less than the estimate, the balance of the money on hand is used in calling in some of these bonds and the property owner to whom the improvement is assessed is given credit on his last installment for the amount saved.

CARL H. PETERSON,
City Manager.

Helping a Community to Get Acquainted with Itself

MOBERLY, Mo.—Believing that a large majority of the citizens of Moberly were but slightly acquainted with their home town, especially as to its resources and industrial possibilities, Mayor Rolla Rothwell recently gave a municipal banquet, and took advantage of that opportunity to present to the gathering some interesting facts about the city. More than 250 representative business men and employees were present on the evening of the banquet, and after the dinner the Mayor addressed the group. He included in his talk figures and data showing the present standing of the various industries of the city, gave the pay-rolls of these concerns, and made every effort to impress his audience with the fact that Moberly was in a flourishing condition and that the future was bright. A member of a local abstract company then made an address in which he quoted figures showing the increase in property values in the city during the last few years.

Shortly after the municipal banquet, the *Moberly Monitor Index* published a "Trade Edition," with the intent of carrying still farther the Mayor's idea of acquainting the citizens with their community. In this issue reviews of all the industries of the town were published, each one showing a steady increase in business over the previous year, the facts and figures having been compiled from answers to a questionnaire sent out by the newspaper to the business houses and professional men of the city. The *Monitor Index* also published interviews with about 200 local business and professional men under the headings "What Does Moberly Need Most?" and "What Is the Business Outlook?"

As a result of the Mayor's banquet and the newspaper's trade review, there have been evidences of a revival of enthusiasm and community pride among the townspeople, and the business men have acquired a more optimistic outlook on the future.

GORDON HUDELSON,
Moberly Monitor Index.

A Village Votes One-Sixth of Its Assessed Valuation for a New School

LOWVILLE, N. Y.—This village of 4,000 population, with an assessed valuation of slightly over three million dollars, has voted a bond issue of half a million dollars for the construction of a new elementary and academic school, and an additional appropriation of $4,500 for the purchase of the necessary additional land.

The present Lowville Academy, an historical educational institution founded in 1805, has for many years been inadequate for the needs of the community. It was originally a private school, and although about twenty years ago it became a part of the union free school district, the property has, up to the present time, been under the control of a separate board of trustees. By a special act of the Legislature, supplemented by a Supreme Court order, the trustees were recently empowered to transfer the property, including an endowment of $46,000, to the school district, provided the voters of Lowville agreed to accept the site and to erect thereon an adequate school building. It was further required that the new school keep the name of Lowville Academy. This proposition, involving the expenditure of an amount equal to one-sixth the entire assessed valuation of the village, was approved by the voters when put before them for the first time—a fact which speaks well for the progressive spirit and local pride of the citizens of this community.

EDWARD C. OWENS,
Secretary, Lowville Chamber of Commerce.

And Equally True of the City

Every spirit makes its house, but afterwards the house confines the spirit.—EMERSON.

Planning a Water-Works System

A Guide for Communities Considering Establishing Their Own Water-Works Utility

A GOOD water-works system is a town's most fundamental utility. It is the first and most necessary step in the development of the town, and makes it a town and not simply a rural community. A community that has grown to 500 persons cannot afford to continue without a water-works system. Many smaller towns have excellent water systems. Without a water-works the town faces the danger of fire and pestilence. If it has an inadequate or defective water-works system, it is worse off, because the danger is concealed.

The value of property, vacant and improved, in a town is ordinarily increased by a good water-works system to an amount about equal to the cost of the system. Land which previously would not have been considered by any manufacturer immediately becomes suitable for factory sites, because fire protection and running water are absolute essentials in industry. The influx of new industries is an important factor in a town's growth. The cost of running water for each inhabitant would ordinarily be less than 5 cents a day, and the advantages of running water are immeasurable. Running water means health protection, something even more important than fire protection, for typhoid causes more deaths than fire, and the health and welfare of the community are of prime importance.

Particular Points to Be Considered

A good water-supply improves property values.

A competent consulting engineer should be engaged.

Plans should be approved by the state health department.

A water source of good quality should be chosen.

Don't underestimate either the present or the future water requirements of your town.

Provide adequate water for fire fighting.

Choose pumping equipment that will be the most economical in the long run.

Duplicate pumping equipment as well as mains should be provided.

Install pipe of ample size to take care of future requirements. It is cheaper.

Don't space hydrants too far apart nor against buildings.

Keep adequate records of mains, valves, hydrants and costs. They are invaluable.

Install a master meter at your reservoir or pumping-station to measure total consumption.

Install service meters to measure the consumption of individual services.

Choose an experienced superintendent and pay him well.

Engaging an Engineer

The first step in establishing a water-works system is to get a preliminary report on the construction work from a reliable engineer or firm of engineers. The cost is customarily paid from the current funds of the community. Preferably the same man or firm should be retained to carry the work to completion later. Engineers draw up the plans, specifications and contracts and during the actual work supervise the construction. Their fee on completion is usually a fixed percentage of the total cost of the undertaking.

Good engineers are known by their records of achievements. Careful search should be made by the town officials for the right man, and under no condition should a man of questionable professional character be employed. State boards of health can be relied upon to recommend reliable consulting engineers.

Approval of the Plans

In some states approval of the plans by the state board of health is required. In any event it is well to have its criticism and suggestions. The board may send its own investigator to the town to gather the data on which to base its suggestions, or may rely upon the material furnished by the engineer employed by the town. The inspection bureau of the fire underwriters

should also be asked to inspect the complete plans in cooperation with the engineers. The bureau's service is free and it can tell you just what new "classification" will be given the town when the waterworks system is installed and can frequently estimate the dollars-and-cents savings that will result from the lowered fire insurance rates. Often the bureau's recommendations for small changes in the details of the plans can increase this saving by bringing the plant even more closely into accord with the requirements for adequacy and reliability of the water system. Any local fire insurance office can furnish the address of the inspection bureau for that locality.

Sources of Water-Supply

The opinion of state health officials should also be sought as to the quality of the water and possible danger of its pollution. Pollution may, of course, occur in a defective system, even though the sources are pure, but the sources should receive first consideration, and measures for their protection should be taken. The question of the hardness of the water is more important than it might seem, as housewives will testify, for the extra expense of profuse soaping required with hard water runs into surprising figures.

Estimating Water Requirements

In figuring the requirements of the town it is always necessary to be liberal. The danger of overestimating the requirements is slight, while that of underestimating them is great. When people use wells and cisterns they are economical, but when they have water from the tap, they find many additional uses for it. They will use about twice as much, moreover, if it is unmetered than if it is metered.

If the town normally uses about 200 gallons per inhabitant per day, as it may easily do if unmetered, it will probably use about 300 gallons per capita daily in summer. People drink more, bathe more, and also sprinkle their lawns and streets, in summer.

The town will need considerable additional water for fire protection. It should be able to maintain a fire flow as shown in the following table, the standard fire stream being one which throws 250 gallons of water through a 1⅛-inch nozzle:

Population	Fire Flow Required—Gallons per Minute	Number of Standard Fire Streams
1,000 or less	1,000	4
2,000	1,500	6
4,000	2,000	8
6,000	2,500	10
10,000	3,000	12
13,000	3,500	14
17,000	4,000	16
22,000	4,500	18

Towns of over 2,500 population should be able to maintain the above rate of fire flow for ten hours. Towns of less than 2,500 should be able to maintain it for five hours. This, of course, is in addition to their ordinary needs. A town of 1,000, therefore, should be able to deliver on emergency about 1,250 gallons a minute. Any storage sufficient to give fire pressure can be subtracted from the capacity needed for fire flow. That is, with a storage capacity of 300,000 gallons for fire purposes, about 250 gallons per minute will take care of the domestic consumption and maintain the reserve. These are the standard requirements fixed by the National Board of Fire Underwriters and are taken from the National Board's standard grading schedule, which is the measure by which town fire protection is classified throughout the United States.

The Pumping System

Towns having a source of supply above the level of the town are fortunate in that they can install a gravity system, which, while its original cost may seem larger, can be operated at much lower cost than a pumping plant. Such towns are in the minority, however, as most towns have to depend on a pumping-station and elevated storage tanks.

Formerly, steam power was used exclusively for pump operations. Internal-combustion engines and electric motors are used to a great extent. Pumps are now manufactured and provided with both electric-motor and internal-combustion engine drive, arranged in such a way that in case of the failure of electric power, the engine will drive the pumps.

Duplicate Equipment

Unless elevated storage is provided, pumping equipment, including engines, boilers, motors, steam mains, air compressors, electric generators and electric lines, should be installed in duplicate throughout,

in order that necessary repairs may not interfere with water service.

In larger water-works where pumps will be operated continuously, there are advantages in having two or more pumps of different capacities. All pumps are designed for a certain speed, pressure and delivery, and any variation from these conditions means a large loss in efficiency and economy. The smaller pumps can be used at night, instead of using the larger pumps at reduced speed. Spare parts should, of course, be kept on hand, including several extra pipe lengths, valves, hydrants and engine parts.

Storage of Water-Supply

Storage capacity should never be less than 50,000 gallons, even in small towns. In some instances it is possible to operate the pump during the day and to use the storage for night supply, which ordinarily is about one-third of the maximum daily consumption. Storage of sufficient capacity to take care of five days' maximum domestic consumption plus ten hours' fire flow will lessen the need of duplicate equipment, inasmuch as most repairs can be made in that time.

The Distributing System

It is in this part of the plans that the town officials are most likely to underestimate the future needs of the town. This is often a costly error. Practically all towns grow in population from year to year. The system should be planned to be adequate just as far ahead as the vision and ambition of the citizens will carry them. Pipe that has been outgrown and is overtaxed will so consume the water pressure by friction as to make the supply practically useless in a fire. It may cost ten times as much to tear up and replace outgrown pipe later as to install pipe of ample size at the beginning. The life of a well-built central water-works is about 50 years, and the cast iron pipe mains may as well be big enough at the start.

Laying the Pipe

Mains should be of a sufficient size to provide for ordinary domestic consumption plus the required fire flow, without giving excessive pressure loss. Especially should the supply lines be in duplicate and generous in capacity, so that interruption in service in one will not deprive the town of water. Feeders should be of sufficient size, considering the length and the character of the section served, to deliver the fire flow necessary for the district, and should be looped so that no district will have to depend on a single feeder. Sometimes in small towns a single large main is run down the principal street, with no other large feeder from the supply. This is a serious error, because important sections then have to be shut off to make repairs, to repack valves or handle emergencies.

Mains should be gated so that not more than a quarter of a mile within the distributing system will be affected by a break. All branch circuits should have gate-valves at junctions with feeders.

All mains should have a minimum cover of at least 2 feet to prevent injury from traffic. It is advisable to lay them deeper, that is, from 4 to 7 feet, to prevent freezing. Water expands when freezing, and a frozen main generally means a break. The character of the soil also is important, as freezing takes place quicker in moist, compact soil.

Metering Services

There is almost universal agreement today that all domestic and industrial services should be metered. Where the flat rate is in force, there is no incentive for the consumer to save water, and every drop of water either used or wasted costs money to impound, store, pump, filter and distribute. The ownership of meters should be vested in the city, which should also keep a good stock of repair parts on hand at all times. A meter-testing machine should also be purchased and meters tested regularly for accuracy, as an inaccurate meter can produce a dissatisfied customer about as quickly as any failure in water-supply service.

Hydrants

Hydrants are cheaper than fire hose. Friction in water-mains is less than friction in fire hose. These two facts should be continually borne in mind in laying out systems. The friction loss in good hose is 10 pounds per 100 feet of hose. Consequently, 50 pounds pressure at the hydrant will be reduced to an ineffectual trickle by

the time it has passed through 500 feet of fire hose. It takes three streams throwing 250 gallons per minute apiece to subdue the average residence fire after it has had a good start.

Mercantile districts should have at least one hydrant at each street intersection, not only on the principal street, but on the parallel streets. No important building should be more than 500 feet from at least two hydrants. On the other hand, hydrants should not be too close to a building. If too near, the firemen may be driven away by the heat, or the hydrant and hose may be put out of service by falling walls. For this reason, where possible, it is wise to alternate the locations of hydrants on two sides of the street.

Hydrants should always have 6-inch connections to street mains to cut down friction loss and should have auxiliary valves so that they can be tested and repaired without shutting off the mains, particularly those hydrants which are located on feeder mains. Where fire pumps are used, hydrants should also have pump outlets.

Hydrants should be inspected, tested and flushed frequently in the spring and fall, and if subject to freezing they should be under constant supervision in cold weather, when most fires occur. Freezing is almost always caused by poor setting or a leaky valve. It may be caused by ground water collecting in and around the barrel. To prevent this, it is well to dump loose gravel at the bottom of the pit when the hydrants are first set, to permit quick drainage. Inasmuch as the best water system is of little use in a fire if the hydrants are not serviceable, regular testing, oiling and repairing of hydrants should be considered as an essential of fire protection.

Water-Works Records

When the water system is installed, the engineering plans should be guarded with the greatest care, to be used for future reference. Without them exact information about the system may be unobtainable, the only other source being the memory of the superintendent or the engineer. Loss of this information may entail, in the most literal sense, a lot of costly digging.

The records should be kept up to date. When additions or alterations are made, notations and alterations should be made on the plats. The location of gate-valves should always be known. Otherwise it may be necessary to cut off the entire supply in case of a break.

Measuring Water Consumption

Even with a gravity supply it is of importance to know the amount of water used. Figures of water consumption are of value in estimating future needs. In no other way can the amount of waste or leakage be determined. Sometimes a town will spend money unnecessarily for plant extension when the proper course is to eliminate hidden leakage. For this reason it is advisable to install a master meter at the pumping-station or on the gravity supply main. Furthermore, at regular intervals of a few years, pitometer water-waste surveys should be conducted, to make sure that the mains are tight and to determine whether they need to be cleaned.

Choosing a Superintendent

The office of water-works superintendent is an important one, as is indeed the office of any one connected with the water service. It goes without saying that the superintendent should be competent, experienced, and independent of political factions. He should be sure of his job as long as he fills it efficiently, and no longer. He is responsible for the lives and property of the entire citizenry. He can be the cause of great financial loss and personal damage to the community, or he can be an active factor in helping it to grow from a town to a prosperous and healthy city. Choose him carefully and pay him well.

ACKNOWLEDGMENT.—Prepared in part from a pamphlet issued by the Cast Iron Pipe Publicity Bureau.

Publication of Council Proceedings in Local Newspapers

FORTY-FIVE cities of New York State have replied to an inquiry from the State Bureau of Municipal Information as to whether the city publishes the official proceedings of its Common Council (exclusive of legal notices) in one or more newspapers. The affirmative replies are fifteen in number, and the negative replies thirty. A report issued by the Bureau gives for several of the cities the prices for publishing the proceedings.

Chamber of Commerce Activities in Public Affairs

Civic Bodies Unite to Study City Budget

DETROIT, MICH.—Since the first of this year, the Detroit Board of Commerce has taken the initiative in a program that promises to have far-reaching results. At the call of President Harold H. Emmons, representatives of the leading business and civic organizations of Detroit were brought together to discuss the possibilities of organizing a group to work in conjunction with the city government, and subsequently what is now known as the Governmental Committee was formed. This is the first time that an attempt has been made in this city to bring together in one working unit the representatives of such groups as the Council of Noon Luncheon Clubs, the Detroit Real Estate Board, Business Property Owners Association, Wholesale Merchants Bureau, Employers Association of Detroit, Michigan Manufacturers Association, Milwaukee Junction Manufacturers Association, Retail Merchants Association, Department Store Group, Detroit Automobile Dealers Association, Detroit Clearing-House, Bureau of Governmental Research, Detroit Citizens League, Postal Employees, Detroit Stock Exchange, Woodward Avenue Improvement Association, Builders and Traders Exchange, Associated Building Employers of Detroit, Associated Technical Societies of Detroit, the Detroit Board of Commerce, and other similar groups.

While various civic and business organizations have in the past attempted to relate themselves to the activities of some phase of the city government, the results have not always been successful, mainly because criticism could so easily be raised against individual groups assisting in matters that are presumably of intimate concern to those particular bodies. However, when all the business and civic organizations band together for a closer tie-up to the entire program of city government, much good will no doubt result.

A permanent program of work is now being mapped out for this Governmental Committee, and the first undertaking, that of helping in the preparation of the city budget, is in progress at the present time. Each group represented on the Committee has been assigned the task of cooperating with one of the city departments in an effort to become better acquainted with the work of that department and to assist where possible in the preparation of its departmental budget. One of the matters to be considered in the near future by the Committee as a whole is the possibility of working out a balanced budget for all the departments of the city, based on the average expenditure of each department over a period of ten years.

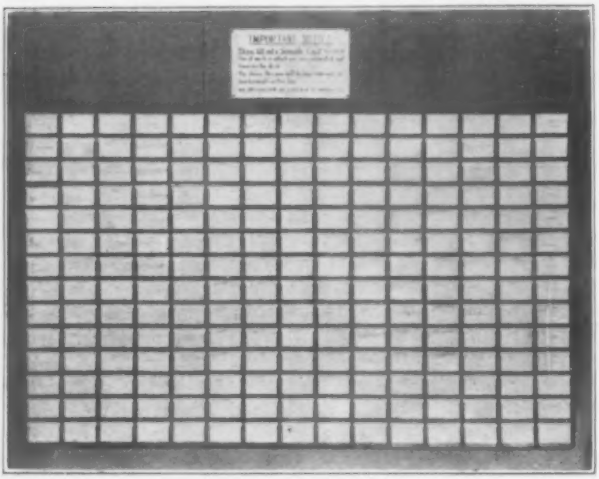
Through close cooperation with the city officials, the Committee hopes to succeed in modernizing the various city departments and to effect considerable savings through the introduction of more efficient business methods.

C. E. BOYD,
Assistant Secretary, Detroit Board of Commerce.

Visualizing the Problems of a Community

PARIS, KY.—Any person in this city interested in the wide variety of activities being carried on under the direction of the combined commercial, civic and recreational organization known as the Paris City Service Club, may now see at a glance the daily status of each project. This has been made possible by an unusual scheme devised by the Club, and worked out in this way:

The Club has had prepared locally two frames, or charts, as they are called, each measuring 5 by 7 feet, and each containing spaces for 210 3- by 5-inch cards. The cards are read horizontally from the left. The left vertical column of each of these frames lists the lines of work in which the joint organization is engaged; in the second column are listed the names of the committees in charge of the various projects; and the third column shows the "Condition, January 1, 1924." The remaining columns are devoted to data on all phases of the work, appearing under the following headings:



COMMUNITY ANALYSIS CHART, PARIS, KY.

The notice at the top reads: "Please fill out a Separate Card for each line of work in which you are interested and leave on the desk. By doing this you will be kept informed of developments in this line. No obligation or expense is involved."

Purpose; Steps; Assignments; Schedule; Conditions Delaying Progress; Organizations Cooperating; Outstanding Office Work; Steps Taken to Date; Dates of Meetings; and New Recommendations.

The chart, therefore, visualizes in brief the purpose of each project, the steps to be taken to accomplish the purpose, and the tasks assigned to the individual members. The latter card also indicates whether or not the assignments have been accepted. Then follows the schedule of accomplishments for each part of the task, including follow-up dates, etc. The listing of conditions delaying progress often shows that delays are due to trivial and easily removed causes, though occasionally, of course, it is seen that a serious obstacle stands in the way. The next card, headed "Organizations Cooperating," frequently shows that a single organization is playing a lone hand when better and quicker results might be obtained through cooperative activity. The outstanding office work is divided into three columns —executive, clerical and stenographic, and this record of unfinished tasks tends to hasten their completion. Whether or not the committee is actually getting results may be plainly seen by the list of steps taken to date, and the next card. "Dates of Meetings," in addition to being a useful calendar of future meetings, helps to show whether or not progress is being made. In the last column may be noted recommendations in connection with any line of work, and these suggestions receive the attention of the committees concerned.

Active business men and others who so often find it difficult to keep in mind from one meeting to the next the status of the projects in which they are particularly interested, will without doubt welcome a visualization of activities such as appears on a chart of this kind. Such a scheme will not only assist them in carrying out the tasks for which they themselves have assumed responsibility, but will tend to extend the scope of their interest along other lines.

WALLACE HATCH,
Executive Secretary, Paris City Service Club.

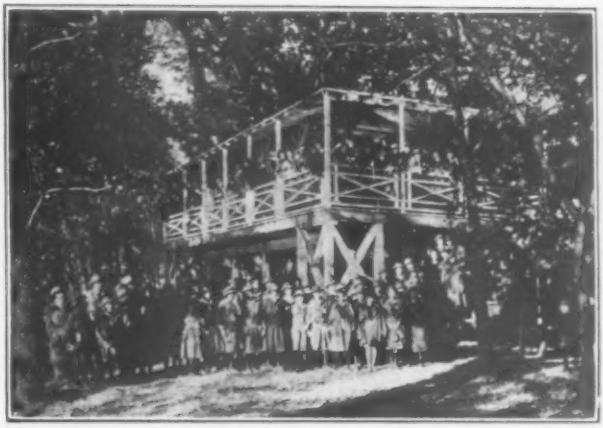
Community Spirit in Terms of Fire Engines

GREAT BARRINGTON, MASS.—This town's up-to-date motor fire-fighting machine is not only efficient but neighborly, having within the last few months saved two nearby communities from serious conflagrations. It has been pointed out, however, that in providing protection for outside towns, the local fire department has laid itself open to criticism inasmuch as Great Barrington is left practically unprotected while the large engine is engaged elsewhere. The Chamber of Commerce, therefore, has started a movement to obtain another "community" fire truck, this to act as an understudy to the town's big machine. The new truck could then be used to answer all first calls for aid from other towns, leaving the large truck at home to provide proper protection there. If this idea is carried out, it is thought possible that some of the neighboring towns will contribute toward the purchase and upkeep of the auxiliary engine. Proponents of the Chamber's plan emphasize that while neighborliness is a most excellent quality, it may perhaps be carried to excess, as happened

for example, in the case of a recent fire which occurred eight miles from Great Barrington. On this occasion seven or eight motor trucks from surrounding communities answered the call for help, though only one was needed, thus leaving a large section of southern Berkshire temporarily unprotected.

As an alternative to the community auxiliary fire engine plan, it has been suggested that only one or two trucks be sent in answer to a first alarm, others to follow if the need becomes great. But, whichever plan is adopted, behind them both is the community spirit expressed in terms of fire engines.

FRANK J. POPE,
Secretary, Great Barrington Chamber of Commerce.



GIRL SCOUTS OF MIDDLETOWN "NUMBERING" ON WILCOX ISLAND

Achievements of a Progressive Park Board in a Small City

MIDDLETOWN, CONN.—Two years ago, at the suggestion of the Chamber of Commerce, there was created by the Mayor and Common Council of Middletown a Board of Park Commissioners of five members, one member to be replaced each year. Although most of the citizens approved this action, it was felt by many that the Board was bound to be more ornamental than useful. Its subsequent activities have, however, clearly demonstrated that even in a small city with attractive rural districts easily accessible, a park board can render very effective service.

During its two years of service the Board of Park Commissioners has succeeded in rehabilitating two small city parks which were suffering badly from neglect; it has employed expert gardeners to go over the grass, trees and shrubs and put them in condition; in the case of the larger plot—a typical New England "green"—curbing has been laid down, seats for the public have been provided, and the general usefulness of the area much increased.

The principal achievement of the Board has been the development of an island of thirty acres of woodland in the Connecticut River near Middletown, recently presented to the city by a public-spirited citizen, W. W. Wilcox, for general recreation purposes. The underbrush has been cleared away, play apparatus installed, a shelter erected and sanitary conveniences provided. Tables for picnic parties have been built and a camp site prepared.

BOY SCOUTS ENJOYING THE CAMPING PRIVILEGES OF WILCOX ISLAND, MIDDLETOWN, CONN.

As the island was accessible only by water, a

foot-bridge was constructed from the shore across an arm of the river. A formal opening was arranged; and although it was well towards the close of the season, hundreds of citizens flocked to the new park and were delighted with its beauty and its possibilities for future development. Local troops of Boy Scouts and, later, visiting troops of Girl Scouts made short camping expeditions to the island.

The plans of the Park Board include the construction of a permanent suspension bridge to the island, a special trolley stop for the convenience of the public, a permanent administration building, water-supply, adequate lighting, etc. An appropriation of $10,000 has been asked for in the city budget of 1924. T. C. DeWolf is Chairman of the Board.

T. L. HINCKLEY,
Secretary, Middletown Chamber of Commerce.

Better Utility Service Through Contact and Understanding

NEWCASTLE, IND.—To secure a greater development of the public utilities serving the city, and thereby improve the gas, electric light, railroad, traction and telephone services, the Newcastle Chamber of Commerce adopted three years ago a policy of cooperation with these utility companies. As its first step in this program, the Chamber invited the officials of the various companies, in groups, to be the guests of the organization at its regular monthly forum dinners. The officials of the Interstate Public Service Company were the first guests under this new plan, and on this occasion the Vice-President of the Midwest Utilities Company was the principal speaker. At the next meeting, representatives of the Big Four, Pennsylvania, and Nickel Plate railroads were present, and as part of their entertainment a trip through several local industrial plants was arranged. Other such meetings followed, and the Chamber's program of cooperation gradually developed and extended.

Through this personal contact between the business men of Newcastle and the officials of the companies, a keener interest in the welfare of this city on the part of the utilities has been established, and the people, in turn, have reached a better understanding of the organization and operation of the companies serving them. This spirit of cooperation has been evidenced in the quick and amicable settlement in the last few years of those questions which are so apt to arise between a community and the public utilities, and, further, has led to some important developments making for improved service to this city. The tying-in of Newcastle with a hydro-electric station has given the city an ample supply of power at low rates, and the new gas plant now under construction with a capacity for handling twice the present needs of the city, will assure an adequate gas supply for some time to come. The construction of a viaduct under the Pennsylvania and Big Four railroad tracks, which will open a large tract for building sites and eliminate a very dangerous grade crossing, has also been decided upon. Thus it has been demonstrated in Newcastle, through the initiative of the Chamber of Commerce, that a city may find it well worth the effort to cultivate the friendship and good-will of its public utilities.

S. A. WARNER,
Secretary, Newcastle Chamber of Commerce.

Local Tax Valuation List Published

PORTSMOUTH, N. H.—Acting upon a recommendation made by the Taxation Committee of the local Chamber of Commerce, the City Council of Portsmouth has just issued, in book form, a complete list of all properties assessed in this city for the year 1923, with the names and addresses of the property owners, and the total personal and real estate tax valuations. The idea that this valuable list be compiled and published in this form originated at a meeting of the Taxation Committee in March, 1923, when the suggestion that the City Council be asked to undertake the publication of such a work received the favorable vote of all members present. The idea was subsequently presented to the Board of Directors of the Chamber and, with their unanimous approval, a formal recommendation on the subject was submitted to the City Council.

ROBERT J. EUSTACE,
Managing Secretary, Portsmouth Chamber of Commerce.

This Magazine Is Not Copyrighted
Quote as you wish, please give credit to THE AMERICAN CITY

TRAFFIC PATHS INDICATED BY BEACONS AND LOW IRON MARKERS, PITTSBURGH, PA.

How Intersections Figure in Traffic Accidents

By George G. Kelcey

A VERY important law relating to traffic is the law of least resistance. Traffic uncontrolled will follow a course that is easiest, rather than take the right course, which is often the hardest.

A check in five localities confirmed the following figures, which were determined in one city: of 247 cars turning left from one street into another, only 31.2 per cent made the proper turn; 68.8 per cent made short left turns, mostly at high speed and in a dangerous fashion.

When two moving elements of traffic meet at right angles, there is no confusion. When they intersect at an acute angle, a confusion area is developed which increases as the angle and speed increase.

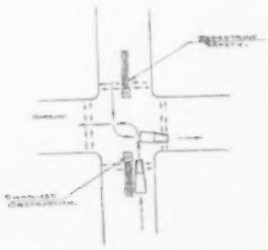
The shortest and easiest course for a left-hand turn at a street intersection—in other words, the line of least resistance—is to make a short turn and pass close to the curb. Such a vehicle gets on the wrong side of two streets, where it is not expected by other vehicles or pedestrians.

A vehicle, making a short left turn, crosses two sidewalk areas and intersects with three other streams of vehicles at an acute angle. This produces the same effect on the drivers and pedestrians as a person walking diagonally across an intersection through traffic.

Vehicles which take wrong courses usually do so because they can maintain a high speed. Therefore, speed is always a factor. As a means of control, assume that all traffic is compelled to circle a spot in the center of the intersection. The accompanying diagrams will show that under such conditions every vehicle intersects with every other vehicle at a right angle, and that every vehicle is in its proper channel. It is also evident that all vehicles intersect pedestrian crosswalks at a right angle.

The object of traffic control at intersections is to check speed so that a vehicle is under easy control, and to compel right-angle intersections. The only practical way to create such conditions is to place obstructions so that they will not interfere with the normal passage of traffic, but so

Confusion caused by unregulated traffic at intersections



Traffic-signaling obstructions block wrong paths on narrow or car-track streets

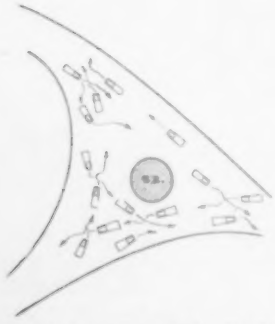
Wider streets permit center installation of traffic beacons

Traffic always takes the shortest cut across an area. The wide flare of acute-angle streets is particularly dangerous to pedestrians

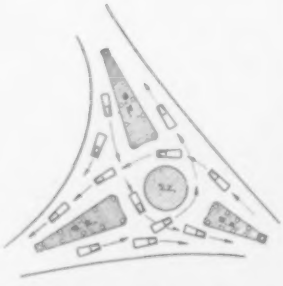
Traffic can be channelized and made orderly if proper areas are marked out or curbed

When several vehicles take short cuts at the same time, accidents are frequent

Circular traffic, where it applies, is the right solution. Rotary movement is the traffic ideal



It took four officers to handle this situation. Accidents were frequent and there was much congestion



Traffic organized and congestion eliminated

that they will block out courses of traffic which are wrong.

An obstruction used for the control of traffic is most effective if it definitely prevents traffic from doing something that is wrong. A properly shaped block of concrete illustrates the point. Such an obstruction must be effectively signalized. The signal has a strong moral effect, and identifies the obstruction; in addition, signals are used to carry directional or police wordings which instruct traffic as to proper procedure or routings.

In streets with pavement widths of 36 feet or more, or with well-rounded curbs, a signal can be used in the center of the intersection. For narrow streets without well-rounded corners, the turning radius around a center obstruction would be so small as to delay traffic. In such cases two signals should be used, one each in the throats of the less-traveled of the intersecting streets. These obstructions and signals definitely block out the short left-hand turn of any vehicle going out of or

coming into this street. A vehicle going out must go straight out until it comes to the curb line. Having reached this point, it is hard to turn inside of, or to the left of, the center of the street. A vehicle entering the street by a left turn is blocked from taking a short cut; it must pass around the center of the street and come straight in. The result is a right-angle intersection of all vehicles and with all pedestrians. Furthermore, they must be at control speed to make the turn. Observe that the signal installations not only control the traffic, but create pedestrian safety zones.

A traffic problem shown at the bottom of page 418 illustrates this discussion and the principles outlined. The problem was a large traffic area in a park with a monument in the center and much pavement space. Analysis showed that there were six major intersection points of traffic in the area, all of them at very acute angles. Traffic approached all the intersection points at speed. Four officers were employed, and in spite of this there were a number of accidents. During the peak hours of traffic, in the morning, cars sometimes lined up four to five blocks along one approach. In the evening a similar congestion resulted in the opposite direction.

A way was found by which the six major intersection points of traffic were reduced to three. These three were moved up close to the monument, so that the three intersections were made as part of a rotary traffic movement. Traffic intersected at these three points at right angles. The problem was so worked out, by means of unattended signals, that there was only one possible course for each line of vehicles to take through the area. These courses produced the effect desired, at a cost of less than $1,500 for the correction, which included three additional safety areas for pedestrians. All four traffic officers were eliminated, and there have been no men on duty at this point since April, 1921. It is reported that at no time has there been any congestion of vehicles, and accidents at the point have been decidedly reduced.

Tom Sawyer Had the Right Idea

By H. E. Boggess

THE fence had to be whitewashed. No getting away from that. And Tom wasn't very enthusiastic about his job. It was *work*, and it was Saturday. Along came Ben Rogers and others of his chums. They "kidded" Tom about having to work. "Work," snorted Tom, in deep disgust, "this is *play!*" Besides, it was something that called for expert attention. After a while, Ben wanted to try his hand at it. Tom refused—it was too much fun. Ben insisted. He offered Tom a big, red apple, and Tom surrendered his whitewash brush.

Tom had the right idea.

He "put it up" to his comrades on the basis of play. It was fun, he said, and they "fell for it."

It is much the same in education. Assignments of the classroom are regarded as work. The lessons you are teaching—the principles of conduct you are trying to encourage—are not always accepted at face value. They lack the saving element of fun, and are frequently "discounted." Boys and girls seldom put their hearts and souls into this classroom work. It must be done—and so they do it. It is a duty—it is work.

Why not "put it up" to these boys and girls on the basis of play? This is different. Heart, mind, and body are yours. The heart is open, the mind alert, the body active. It is fun—it is play.

Tom Sawyer discerned the mighty chasm that separates these two—work and play. He turned this difference to his own lazy advantage.

The teaching profession has discerned the same vital distinction, and in a much bigger way. Teachers are taking advantage of this difference to further the larger ends of education. They realize that youthful minds often make an "allowance" for classroom lessons and that the lessons of the playground are accepted without a minimizing mental reservation.

The playground, however, cannot shoulder the entire burden. To be sure, the correct way to spell "seneschal" or "chrysan-

themum" will never be learned while playing volley-ball. Nor will the exact distance between Vladivostok and Copenhagen ever be arrived at on the giant stride. Nor the interesting fact that on the 4th of September, 1725, Louis XV. married Marie Seszcynski, daughter of Stanislaus—this will never be learned on the merry-go-round.

Perhaps these things are very important. It is certain, at least, that most lessons taught in the modern schoolroom possess a definite value. But are not the following lessons equally important—loyalty, obedience, cooperation, sacrifice, fair play?

These are the lessons of the playground. Nowhere are they learned more effectively. Nowhere do they receive the same serious and receptive consideration. For the work of the playground is play. Because they are a definite part of the game, the child accepts the lessons. These lessons become a part of daily lives.

In addition to developing the physical body, the playground is an excellent builder of character. Young America learns to be loyal—to "stick up" for its own side. Boys and girls—in the most formative period of their lives—learn to work and cooperate with others. They learn to play the game fairly and squarely—to obey the rules or be put out. The "bad boy" problem (which is largely a problem of misdirected energy) is partially solved. Personalities which are inclined to be bashful and shy develop a sense of confidence.

It is on the playground that the child learns what is fair and what is unfair—what is right and wrong—what is honorable and what is underhanded. It is there that the rules for the game of life are worked out.

And we have come to realize the importance and the possibilities of play. We understand—now—that the adolescent mind is peculiarly receptive while at play. We have decided to take full advantage of this fortunate situation. We are teaching many important lessons of conduct, and we are teaching them at the right time—when boys and girls are most responsive.

With the general recognition of the possibilties of play, has come the recognition that the playground, also, has large possibilities. Not so many years ago, we considered a playground as an open space cleared, more or less, of rubbish. Playground equipment, if there was any, was of a nondescript nature. There were few definite standards. There was little regard for safety, and even less for appearance. Grounds were laid out in a careless and haphazard manner.

This attitude of mind has experienced a sharp reversal. The playground is coming into its own. Hundreds of thousands of dollars are appropriated annually for playground purposes. Not only in the large cities, but also in towns, villages, and rural districts, the playground has been a tremendous force for Americanism and an effective aid to juvenile decency.

Gradually there is growing up a science of the playground. We are beginning to sense the tremendous possibilities, and we are learning the playground business. Confronted with a certain situation, we know what to do.

Granted, for example, a plot of ground—what may be done with it? How can we use every square foot to the best possible advantage? What type of equipment is best suited to the space at our disposal? Where shall the various units be placed? How shall we lay out the grounds? Are we providing plenty of equipment—and equipment which completely satisfies the play instincts of our different groups of children?

These questions cannot be answered—all of them—casually. At least, they should not be. For every plot of ground presents its own peculiar problems. No two groups of children have the same equipment needs. There are, however, certain things that we can settle upon—certain facts that have been definitely determined.

In the first place, the successful playground will always be clean, neat, and inviting. It must compete with the not-to-be-denied appeal of railroad tracks and dangerous streets. It should be free from weeds, gullies, stones and cinders. Children should be taught to regard it as their own. They should be encouraged to keep it free from scraps of paper and rubbish.

In the second place, equipment should be adequate; it should be safe; it should be durable; it should be strong. Not always is this matter of equipment given the consideration it deserves. Selections are frequently made at random, and units are placed in the same manner. Equipment is sometimes positively dangerous. One unit may interfere with another. Equipment may not be suited to the needs of individual schools. One group or type of children

Drawn by Clifford Knight of the Hartford Post for THE AMERICAN CITY

THE KIDS: That's a fine plan, Mister, but where are the playgrounds?

may be favored, another slighted.

There are many possibilities for mistakes, and even more possibilities for success. Fully equipped playgrounds do not, as a rule, spring into existence over night. They are the result of careful planning and well-informed buying. They experience a slow, steady, healthy growth.

A good, clean playground—with plenty of good, safe equipment and with adequate supervision—is a pretty good indication that the officials in charge have discovered the same principle that came to Tom Sawyer when he had to whitewash the fence. They have come to realize that play is the normal and natural work of the child. They have learned that the very best time to reach the child is when he is lost in he spirit of play. The youthful mind is then —and only then—wide open.

Traffic Problem in 1916 and 1923

HOW rapidly traffic regulation has become an acute problem in the smaller communities is evident from the conditions of seven years ago as compared with those of to-day.

In 1916, Henry C. Wright, one of the Commissioners under the Mitchel administration in New York, wrote in THE AMERICAN CITY:

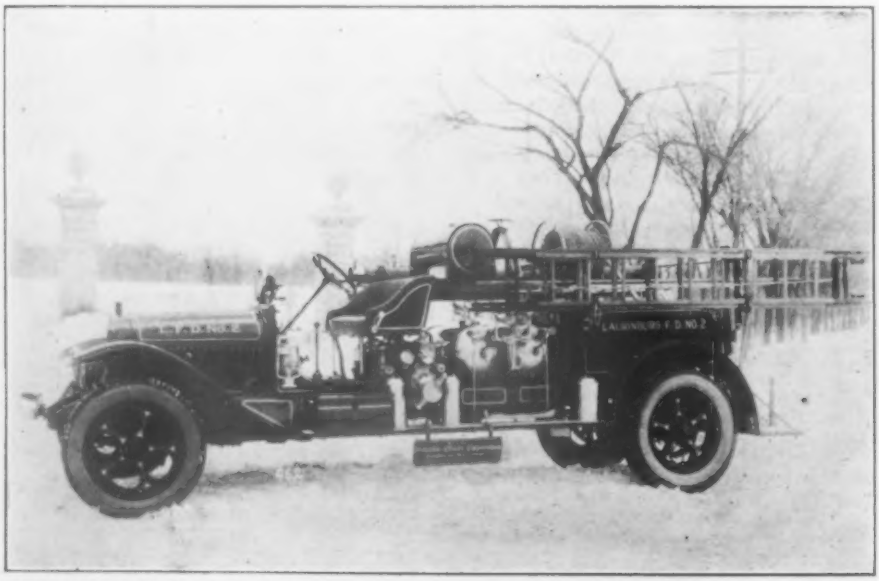
> "Cities of less than 200,000 population seldom have traffic congestion that necessitates regulation."

Although the conditions of to-day are too generally and acutely known to need much elaboration, the following figures from a town of 3,000 are illuminating:

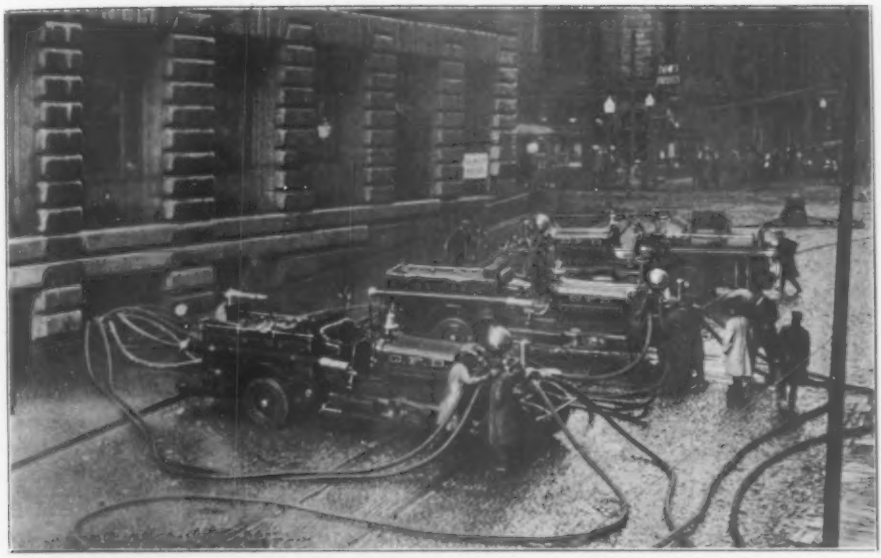
In Los Gatos, Calif., on Saturdays, Sundays and holidays the cars passing the main corner of the town are counted, with an automatic checker, from four to ten hours during the busy time of the day. From this official count, H. O. Baird, Town Marshal, reports that in 160 hours, from May 20 to September 10 last, 163,331 cars used this corner, an average of 1,021 cars per hour. The greatest number of cars in ten consecutive hours was 15,270. The greatest number in one hour was 2,437, at which time there was not room for one more car in the line for more than five miles.

Motor Fire Apparatus in the Service of American Cities

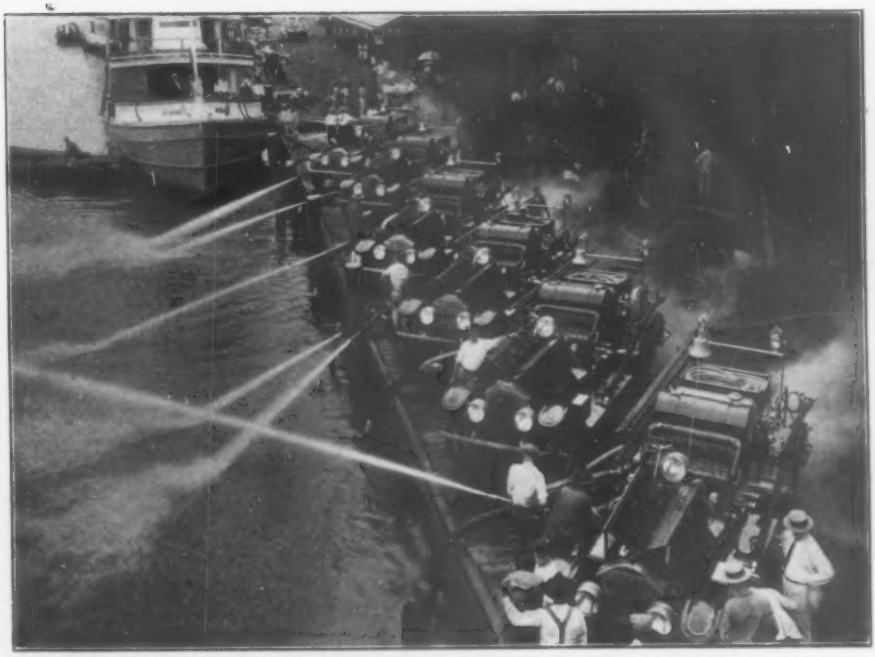
A CHILDS TRIPLE-COMBINATION PUMP, CHEMICAL AND HOSE CAR MOUNTED ON A WHITE CHASSIS, IN SERVICE AT LAURINBURG, N. C.



GMC TRUCK, EQUIPPED BY THE NORTHERN FIRE APPARATUS COMPANY, WHICH SUCCESSFULLY PASSED THE 400-GALLON UNDERWRITERS PUMPING TEST BEFORE DELIVERY TO THE FIRE DEPARTMENT OF BEATRICE, NEBR.



THREE AHRENS-FOX PUMPERS IN A RECENT TEST OF THE SPRINKLER SYSTEM INSTALLED ON THE EXTERIOR OF THE UNION CENTRAL LIFE INSURANCE COMPANY BUILDING CINCINNATI, OHIO



THE FIRE DEPARTMENT OF MOBILE, ALA., TESTING A DELIVERY OF FIVE AMERICAN-LA-FRANCE TYPE 75, TRIPLE-COMBINATION PUMP, CHEMICAL AND HOSE CARS OF 750 GALLONS CAPACITY, AND ONE TYPE 12, TRIPLE-COMBINATION OF 1,000 GALLONS CAPACITY

The City's Legal Rights and Duties

Conducted by A. L. H. Street, Attorney at Law

State Control Over Municipal Funds

"CITIES are mere instrumentalities of the state, for the convenient administration of government; and their powers may be qualified, enlarged, or withdrawn at the pleasure of the Legislature, and the revenues of a city raised by taxation, though levied for specific public purposes, are so far subject to the legislative will that by it they may be applied to other uses of the municipality, subject, of course, to constitutional limitations."

This statement, taken from the opinion of the Nevada Supreme Court in the case of City of Reno vs. Stoddard, 167 Pacific Reporter, 317, is in line with what the courts throughout the country hold, as applied to cities not operating under home-rule charters.

In the case of Tippecanoe County vs. Lucas, 93 United States Reports, 108, the highest court of the land decided that the power of the state was broad enough to permit the Legislature to direct a restitution to taxpayers of funds exacted from them by taxation. But the United States Supreme Court also declared, in the case of United States vs. Quincy, 71 United States Reports, 535, that where a state has authorized a municipal corporation to contract, and to exercise the power of local taxation, to the extent necessary to meet its engagements, the power cannot be withdrawn until the contract is satisfied. The Court held that "the power given becomes a trust which the donor cannot annul, and which the donee is bound to execute; and neither the state nor the corporation can any more impair the obligation of the contract in this way than in any other."

In the case of Davock vs. Moore, 63 Northwestern Reporter, 424, the Michigan Supreme Court sustained the validity of an act of the Legislature directing a transfer of funds for use by the Health Department of the city of Detroit. The Court remarked that "the preservation of the public health is not a local purpose, and the consent of the locality is not material, where the function is a public or general one." And, holding that there is no constitutional bar, so far as a city is concerned, to its being compelled to transfer money from one fund to another, and that a city had no vested right in liquor tax revenues, the Court added:

"The Legislature had the right to impose the burden upon the city to defray the expense of the health board, and it cannot be said that the transfer of money from one fund to the other to pay a debt deprives the city of its property, within the . . . United States Constitution. It is apparent . . . that the City Treasurer had sufficient funds on hand to make the transfer without detriment to the city, or to any of the objects to which those particular funds were appropriated, and the fund from which the moneys for the health board are to be taken is to be replenished by the moneys from the liquor taxes. The fund from this source is absolutely under the control of the Legislature. While the property which a municipal corporation acquires in the exercise of its corporate powers is protected from legislative interference as vested rights, yet in provisions of the law for the revenue of the city, whatever form such provision may take, the city has no vested right; and the Legislature may at any time, so far as the municipal corporation is concerned, change and modify, or altogether take away the particular source of revenue."

It was decided by the Ohio Supreme Court in the case of Alter vs. Cincinnati, 46 Northeastern Reporter, 69, that the Legislature had power to provide that water-rents collected by defendant city should be applied to aid construction of water-works.

In the case of Horton vs. Newport, 61 Atlantic Reporter, 759, the Rhode Island Supreme Court decided that the state might require municipal corporations to pay the salaries of local police officers, although such officers were officers of the state and appointed under its authority, saying:

"It would appear upon general principles that, if the general assembly has the right to 'control police,' although their duties are confined to a certain locality, it would have the equal right to provide for the payment of the expenses of the local police department out of the local funds of the municipality, and that such payment could lawfully be required only out of such funds; and, upon examination of the authorities cited, such is found to be the law."

The Court cited a similar decision reached by the Maryland Court of Appeals, and a decision of the Missouri Supreme Court upholding a law which charged Kansas City with payment of a criminal court's stenographer. Additional authorities are cited "as to the general power of the Legislature for the appropriation of funds of county, town, or city for the purpose of paying for local improvements or for the payment of disputed claims, etc."

Sundry Items of Municipal Law

Traffic Ordinance Held to Be Void for Unreasonableness

An ordinance forbidding, under penalty, that vehicles be driven along a street, excepting as "near as possible" to the right-hand curb, is void for unreasonableness, according to the holding of the Indiana Supreme Court in the case of Bennighof-Nolan Company vs. Adcock, 141 Northeastern Reporter, 782. The Court said:

"The entire width of a highway is devoted to public travel, and the authority of the city over the streets was conferred in general terms. It was only 'to regulate the use of streets and alleys by vehicles.' . . .

"But obviously an ordinance which attempted to make it unlawful to drive on any part of the street except 'as near to the curb as possible' on either side would not be a reasonable traffic regulation. Whether the city had power, by ordinance, to require that vehicles be driven 'as near as practicable' to the right-hand curb, is not a question before the Court, but we doubt its power to exclude automobiles that keep to the right of center from traveling near the center of a paved street when not required to turn out to the right side for another vehicle to pass."

"Silent Policeman" as Street Obstruction; Notice of Damage Claims

A concrete post maintained by a city at a street intersection to guide traffic, without any guard, and without any light or other means of notifying persons traveling upon the street of its presence, constitutes a defective condition in the street, within the meaning of a statute, requiring written notice to be given a city of injuries resulting from such defects within sixty days as a condition precedent to maintaining action on account of such injuries. In reaching this conclusion in the case of Titus vs. Town of Bloomfield, 141 Northeastern Reporter, 360, the Indiana Appellate Court said:

"The manifest purpose in the enactment of the statute under consideration was to enable the officers of a city or town to make an investigation of the nature and validity of a claim for damages at a time when the facts could be best ascertained; the purpose being not only to make possible a timely investigation of the alleged defect, but also as to the extent of the injuries claimed. . . .

"It is well settled in this state that actual knowledge on the part of the officers of a city or town of all the facts will not dispense with the written notice required by the statute."

Discriminatory Ordinance Held Void as a Fire-District Regulation

An ordinance of the city of Shreveport, forbidding conduct of the business of a junk dealer within the established fire limits of the municipality, excepting in brick buildings, has been declared by the Louisiana Supreme Court to be void. In this case (City of Shreveport vs. Schultz, 98 Southern Reporter, 411), the Court said:

"If we could imagine any plausible basis for this classification of the junk dealers, as distinguished from all other merchants, and for this discrimination against the junk dealers and in favor of all other merchants, we would be constrained to defer to the judgment of the municipal council—assume that the reason for the discrimination was sufficient—and declare the ordinance valid. But we find it almost as hard to reconcile our judgment to the discrimination in this case as it would be if the ordinance prescribed dealers in asbestos, or fire extinguishers not kept in fire-proof buildings."

The ordinance was found to be unjustly discriminatory as restricting business in which the fire hazard is small, while more hazardous businesses were exempted.

City Held Subject to Injunction on Account of Practices in Operating Light Plant

Where a privately owned and operated light plant competed with a municipally owned and operated one, the owner is entitled to enjoin the city from enforcing burdensome and unreasonable ordinances which are manifestly intended to handicap unfairly the private plant in securing and retaining patronage, holds the Texas Court of Civil Appeals in the late case of City of Bowie vs. Painter, 255 Southwestern Reporter, 490. Judgment was awarded against the city under a claim that it had adopted ordinances prohibiting the privately owned plant from offering certain inducements and free service that were offered by the municipal plant.

CATERPILLAR
Reg. U.S. Pat. Off.

The "Caterpillar"* Always Cuts Costs

The "Caterpillar" has furnished cities and townships of every size the means for making tax funds go furthest. A sturdy, practical tractor, developed to its present perfection through a world-wide, diversified experience such as no other machine can boast, used and endorsed by experienced city, road and park officials, state highway departments, governments, contractors, engineers and industrial plants, the "Caterpillar" can be depended upon for economical performance, no matter what the tractive job may be. It soon pays for itself through the economies it effects over old and cumbersome methods. It saves the cost of labor, eliminates teams and has the strength and endurance to stand up under continuous heavy duty.

There is a "Caterpillar" of size and capacity to meet the public-works budget of every city, town and park board. The 2-Ton is a fast, compact worker, invaluable for all the lighter jobs. The 5-Ton is equal to any medium power need; hauling, road-making, maintenance, snow removal, scarifying, etc. The 10-Ton is supreme in the heavy duty field, easily handling the largest size graders, scarifiers, snow-plows and provides the most economical power for transportation of materials.

We invite inquiries from city, park and road officials concerned in getting the most work done at the least cost. Let us give you actual records of reductions in cost effected by "Caterpillars" in every class of municipal work. *Back of every "Caterpillar" is Holt's positive guarantee of satisfactory performance.*

**There is but one "Caterpillar"—Holt builds it*

THE HOLT MANUFACTURING COMPANY, *Inc.*

PEORIA, ILLINOIS — STOCKTON, CALIF.

Eastern Division: 250 W. 54th Street, New York

Branches and service stations all over the world

City Council May Reserve Discretion to Choose Between Paving Materials

A paving ordinance was not vitiated by a provision for subsequent decision by the city council as to which of four different kinds of material—asphaltic stone, asphaltic cement, plain asphalt or brick—would be used, holds the Illinois Supreme Court in the case of City of Olney vs. Baker, 141 Northeastern Reporter, 750. However, this decision was influenced by the circumstance that the original resolution in the proceedings, as well as the preliminary estimates, plans and specifications, described each of the proposed methods in detail. The Court said:

"We know of no authority which prevents bids being received on several kinds of paving work, where the purpose for so doing is to bring about fair and really effective competition among bidders for the construction of the improvement contemplated. Some discretion must be left to officials in charge of the work to be done. Most public officials who are honest and fair in the dealings on behalf of a municipality know that two kinds of competition are very desirable in obtaining bids for paving, namely, competition between different kinds of paving, or those who are capable of laying the several kinds, and competition between bidders who are able to lay the same pavement."

Zoning Notes

Prepared by Frank B. Williams

Author of "The Law of City Planning and Zoning"

From data collected by the Zoning Committee of New York (233 Broadway), and from other sources

For further information, Mr. Williams may be addressed in care of
THE AMERICAN CITY MAGAZINE, 443 Fourth Avenue, New York

Recent Zoning Ordinances

In the latest bulletin of the Department of Commerce, Washington, D. C., referred to below, are listed the following zoning ordinances, not given in the previous bulletins of the Department, or in these Zoning Notes:

Pittsburg (1923), Stockton (1923), Whittier, Calif.; Framingham, Holyoke (1923), Mass.; Ann Arbor (1923), Mich.; Bayonne, Clifton (1921), West New York (1922), N. J.; Union Corners, Waverly, Wilmont, N. Y.; Petersburg (1922), Va.: Waukesha (1923), Wis.

A correction: Seattle, *California*, in the September, 1923, Notes, should read Seattle, *Washington*.

Recent Zoning Decision

NEW JERSEY—Allen v. City of Paterson et al., Supreme Court, July 9, 1923, reported in 121 Atlantic 610.

Certiorari: The Board of Appeals of the city varied the requirements of the local ordinance requiring a garage to be built 14 feet from the street line by allowing it to be constructed in this case 7½ feet from that line, on the ground that the shape and size of the lot made the construction of a garage on the lot in compliance with the letter of the ordinance impossible. The New Jersey law provides that:

"The jurisdiction of the Board of Appeals shall be defined in such ordinance. But in no case shall the authority vested in such board extend beyond varying or modifying the provisions of said ordinance where the enforcement of its strict letter would work unnecessary hardship or injustice to property owners."

Held that under this law the Board had the power to vary the ordinance, in a case like this, to prevent unnecessary hardship. The power to do so, in the absence of unreasonableness, fraud or *mala fides*, on its part, is not controllable by the courts. The action of the Board is therefore sustained.

Location of Telephone Exchanges

A conference of city planners, city officials and officers and experts of the Bell Telephone Company of Pennsylvania was held on December 14, 1923, at the office of the company, 261 North Broad Street, Philadelphia. The location of telephone exchanges, like the location of garages, is a zoning problem of great importance and difficulty. Like the garage, the telephone is a local necessity, and like the garage, it is often an alien structure in locations where the telephone company wishes to place it. A conference of the various parties interested in discovering the principles underlying the solution of this problem for the good of all concerned, is therefore a matter of interest to planners, city officials and telephone companies throughout the country. A record of the conference, consisting of a pamphlet of 100 pages, with an appendix of maps, diagrams, and tables and graphs of statistics, has been published by the Bell Company, entitled "Conference on Zoning as Affecting Telephone Problems."

Zoning Bulletin, Department of Commerce

The Department of Commerce at Washington, D. C., has just issued a zoning bulletin, dated January, 1924. It shows that zoning ordinances were at that date effective in 221 municipalities in the United States, 81 municipalities with a population of about 8,000,000 having adopted such ordinances during the year 1923. A complete list of zoned municipalities, and of zoning enabling acts is given.

Autocars have kept Washington spic and span for 14 years

4-cylinder 4 to 6 ton Autocar, 1200-gallon tank body, owned by the District of Columbia

IN 1909 the Executive Commissioners of the District of Columbia bought their first Autocar. Since that time they have placed many repeat orders for Autocars, and, recently have purchased two more 4-cylinder 2 to 3 ton models, and also a 2 ton Autocar Electric.

The 4 to 6 ton model pictured above is equipped with a 1200-gallon street flusher, which is worked on two eight-hour shifts a day. This truck flushes an average of 135,000 square yards of pavement on the day shift and 190,000 square yards on the night shift.

Autocar motor trucks are a safe investment for public officials. The product of one of the oldest and largest motor truck factories, each Autocar is assured continuous and expert service attention by the nation wide system of Autocar Direct Factory Branches.

Capacities 1 to 6 tons; Chassis prices $1100 to $4800.

The Autocar Company

ESTABLISHED 1897

Ardmore, Pa.

Branches in 46 cities

Autocar

gas *and* electric trucks

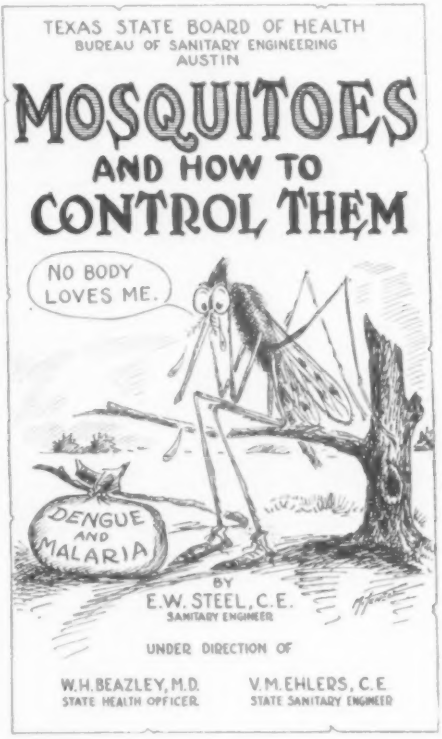
EITHER OR BOTH - AS YOUR WORK REQUIRES

Hints, Helps and Happenings

Controlling the Mosquito

THE cartoon here reproduced is from the striking cover of a pamphlet on mosquito control issued by the Bureau of Sanitary Engineering of the Texas State Board of Health. From the same source can be secured "The Story of the Mosquito," for use in the schools, and a mimeographed "Chalk Talk" on mosquitoes, with charts to aid the lecturer.

Among other agencies doing particularly effective mosquito-control work, from which local communities can secure printed matter or aid, are the U. S. Department of Agriculture, the U. S. Public Health Service, and the New Jersey Agricultural Experiment Station (New Brunswick, N. J.).



Noise Nuisance Suggestions from Civic Club

THE Civic Club of Philadelphia, through its Joint Committee on the Noise Nuisance, of which Mrs. Imogen B. Oakley is Chairman, has suggested to Director Butler the following six ways by which the committee believes the unnecessary noise of the city can be decreased without detriment to any one and with a vast increase to the public comfort:

First, that heavy traffic shall be diverted from residential streets from 8 P. M. to 8 A. M., with especial consideration of Spruce and Pine Streets, which, being so near to Chestnut and Walnut Streets, are afflicted with their heavy traffic overflow.

Second, that one standardized horn shall be required on every motor vehicle, the siren and klaxon to be put under the ban of the law.

Third, that the law against the use of muffler cut-outs be strictly enforced.

Fourth, that drivers who sound their horns uselessly and continuously between intersections and in traffic jams be subject to arrest and fine.

Fifth, that the law forbidding street vendors to call their wares in any part of the Commonwealth be strictly enforced. Hotel keepers make especial complaint against the cries of newsboys, which they report as excessively annoying to their guests.

Sixth, the Joint Committee on the Noise Nuisance believes that to add a gong to the proposed semaphore system would be a useless increase to the already large number of gongs which perplex and bewilder the pedestrian.

Preventing Dust Explosions in Industrial Plants

THE results of an investigation by state and Federal officials of the explosion at the plant of Corn Products Refining Company, Pekin, Ill., January 3, 1924, are given in a statement obtainable from John G. Gamber, State Fire Marshal of Illinois.

The explosion apparently originated from a fire caused by an overheated bearing in a conveyor box in the basement of one of the buildings, and at a time when one of the starch buggies or wagons was being dumped. The dust produced by the dumping of the wagon would furnish a cloud to be ignited by the fire in the conveyor box in the basement and, in the opinion of the investigators, the first or primary explosion occurred at this point. Later the fire reached the packing machines in another building where a second and more violent explosion occurred, severely burning the men in this part of the building and causing extensive property damage.

In the opinion of the investigators, information of considerable value not obtained in the investigation of previous explosions of this character has been obtained, which will enable the

E-3632
(Patented)

MUELLER

MEMBERS
THE NATIONAL
TRADE EXTENSION BUREAU
PLUMBING AND HEATING INDUSTRY

Protecting the Public Health

The importance of public health protection is shown by the special laws passed by many states endorsing sanitary drinking fountains in public parks, theatres, libraries, factories, offices, and private residences.

MUELLER
Sanitary Drinking Fountains

do away with the unsightly public drinking cup—prevent possible contamination—insure quick and convenient service—give lasting satisfaction.

No. E-3632 above, one of the many Mueller designs, is especially adapted for use in public parks, because the galvanized iron stand enables small children to use it easily. Complete descriptions and prices upon request.

Mueller Co., Decatur, Illinois, U. S. A.

145-149 W. 30th St., New York; 1072-76 Howard St., San Francisco; 2468 Hunter St., Los Angeles

application of additional control measures for the prevention of these dust explosions in industrial plants throughout the world. The investigators recommend that operations in which dust is produced in large quantities should be separated from other operations in industrial plants of this character, and that such operations as starch dumping and packing should be carried on in separate buildings, remotely located from the other parts of the plant, and that these buildings should be of such construction as to afford the least resistance in case of explosion and not confine the pressure.

Regional Town Planning Progress in England

ONE of the most striking of the recent developments of town planning in England has been the voluntary combination of local authorities to form Joint Town Planning Committees for the purpose of planning, cooperatively, regions comprising an economic or geographical unit, in order that individual schemes may, to the mutual benefit of the several communities, form part of a large pattern of development, designed to meet the economic and social needs of the whole unit of common interest.

The following is a list of 22 Joint Town Planning Advisory Committees already established, set out in approximate order of formation:

Region	No. of Authorities	Approximate Acreage	Approximate Rateable Value £
Doncaster	8	108,160	1,250,000
Manchester	88	512,098	17,442,543
Deeside	9	67,550	491,500
S. Tees-side	7	88,300	1,000,000
W. Middlesex	19	73,410	2,600,000
S. Tyneside	10	47,735	1,836,746
N. Tyneside	14	137,000	3,400,000
Rotherham	5	63,540	700,000
Mansfield	9	100,000	624,000
Wirral	8	59,640	2,046,000
N. E. Surrey and W. Kent	12	83,644	3,631,186
Thames Valley	10	23,615	1,758,272
East Glamorgan	12	220,528	3,676,729
Lancaster and district	5	15,283	396,500
Mid Glamorgan	5	89,241	334,595
East Kent	14	150,657	1,438,921
Leeds and Bradford	39	231,068	7,809,081
Nottingham and district	13	171,918	2,196,584
Afan and Neath Valleys	4	93,731	502,433
Midland	49	265,072	11,872,742
North Tees	3	19,112	469,466
South Essex	5	74,823	705,576

The Doncaster, Deeside and North Tyneside Committees have agreed upon their reports, and those of the two first-named have been published, with reproductions of the plans. The Preliminary Report of the West Middlesex Joint Committee has also been published. In several other cases particular joint proposals have been agreed upon and are being carried out.

The representation of constituent councils varies considerably. For example, in some cases urban districts have two members each and the rural districts each one member; in others, representation varies in proportion to an approximate mean of area, rateable value, and population. County councils cannot have voting members on Joint Town Planning Committees, but in most cases have appointed representatives to attend the meetings, accompanied by an official, and help with advice.

THE SHADED AREAS ARE THOSE IN WHICH JOINT TOWN PLANNING COMMITTEES HAVE BEEN ESTABLISHED OR (IN THE CASE OF FIVE) RECOMMENDED

In respect to the following additional regions, conferences of representatives of the local authorities concerned have recommended that Joint Town Planning Committees should be established:

Region	No. of Authorities	Approximate Acreage	Approximate Rateable Value £
Monmouthshire	30	397,146	2,444,334
West Glamorgan and East Carmarthen	17	395,564	1,987,874
Halifax and Huddersfield	44	185,242	2,963,393
Bath and Bristol	16	410,510	3,932,392
Chesterfield	8	115,175	762,231

From a statement by G. L. Pepler (Past President) in the *Journal of the Town Planning Institute*, February, 1924.

Property Valuations and Tax Levies —a Ten-Year Comparison for the United States

IN a statement issued last month by the Department of Commerce, figures are given for each of the forty-eight states, compiled by the Bureau of the Census, showing the total assessed valuation of all property subject to general property taxes, and the total levies of general property taxes for 1922 in comparison

Harvard Street, Cambridge, Mass. Tarvia-built 1907. Today, after seventeen years of traffic this street is in perfect condition.

This Car?
Junked long since

—but the street is still good

"17 years' continuous service"— Tarvia roads endure

GONE are those old-time cars with their weird grunts and protesting snorts. One of them is pictured here. Seventeen years ago it used to startle the inhabitants of Cambridge, Mass. That was the year the Tarvia pavement was laid on Harvard Street —back in 1907.

Seventeen years have rolled by—seventeen years of unceasing motor traffic—yet the Tarvia pavement on Harvard Street is still in excellent condition.

Tarvia streets can be maintained indefinitely at little cost —only economical maintenance is needed to make a Tarvia Pavement last indefinitely.

And in addition:

Tarvia pavements will not wave, roll or rut.

Tarvia pavements are skid-proof because of their granular surface.

Thousands of Tarvia streets and roads have proved to taxpayers that—

For the money spent—Tarvia gives more miles and the most years of satisfactory service.

Every paving requirement — construction, repair or maintenance—can be met with Tarvia.

Tarvia
For Road Construction Repair and Maintenance

The Barrett Company

New York	Chicago	Philadelphia	Boston
St. Louis	Cleveland	Cincinnati	Pittsburgh
Detroit	Kansas City	Birmingham	Dallas
Minneapolis	Salt Lake City	Bethlehem	Lebanon
Youngstown	Milwaukee	Toledo	Columbus
Baltimore	Syracuse	New Orleans	Rochester

In Canada:
THE BARRETT COMPANY, Limited

Montreal	Toronto	St. John, N. B.
Winnipeg	Vancouver	Halifax, N. S.

with 1912. The basis of assessment has changed in some of the states during the ten-year period, and accounts in part for the large per cent of increase shown.

The general property tax is the common designation of the direct tax upon real property and upon other property which is apportioned and levied by substantially the methods employed in apportioning and levying taxes upon privately owned real property. The report gives the total levies of general property taxes, as thus defined, for the state governments, counties, cities, towns, villages, school districts, townships, drainage districts, and all other civil divisions having the power to levy taxes.

The totals and averages for the entire United States are as follows:

ASSESSED VALUATION OF PROPERTY

	Total for U. S.	Average Per Person
1922	$124,616,675,000	$1,146.16
1912	69,452,936,000	715.48

LEVIES OF GENERAL PROPERTY TAXES

	Total for U. S.	Average Per Person	Average Rate Per $100 of Assessed Valuation
1922	$3,502,941,000	$32.22	$2.81
1912	1,349,841,000	13.91	1.94

The increase in assessed valuation in the ten-year period was 79 per cent, and the increase in total taxes levied during the same period was 160 per cent; but the average rate per $100 of assessed valuation increased only 45 per cent.

Restriction of Outdoor Advertising

TO urge the confinement of outdoor advertising to commercial locations, where it will not injure scenery, civic beauty or residential values, is the purpose of the recently organized National Committee for Restriction of Outdoor Advertising, of which Mrs. W. L. Lawton, of Glens Falls, N. Y., is chairman. Membership in the Committee is open to all organizations interested in this work.

In outlining the purpose and spirit of the campaign, the Committee says:

"We believe that most of the national advertisers, when they realize how this form of advertising is ruining the beauty of our country and arousing the resentment of the people, will gladly cooperate with us.

"We are distinctly opposed to boycotting.

"Our aim is to arouse the public opinion already existing against out-of-place signboards, vocalize that opinion, and express it directly to the advertiser.

"In response to the local Glens Falls campaign, several national advertisers have agreed to keep their display advertising off the Lake George Highway. They at once ordered their posters off the road, and will discontinue their painted bulletins as fast as they expire."

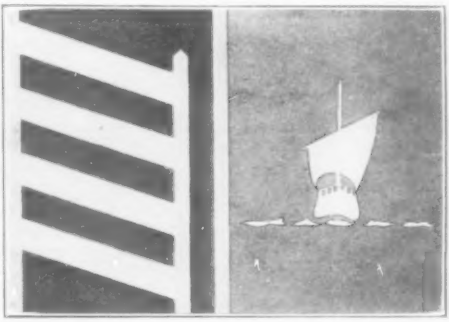
The growing sentiment among national advertisers against bill-boards which destroy the beauty or add to the danger of highway travel, had striking testimony in an announcement on March 24 by the Standard Oil Company of New York, of its intention to abandon all highway bill-boards where they are objectionable or mar the scenic effect. Herbert L. Pratt, President, said that the company would confine itself to boards at garages and service stations, and that the removal of the last sign was expected within eighteen months, when the last contract had expired.

"It is the desire of the management of this company," said President Pratt, "to cooperate in every way with the various civic organizations and women's clubs in its territory, which are seeking to improve the natural beauties of the highways."

City Flag Combines Welcome and Warning

A WELCOME to visitors and new residents, and a reminder of the great fire of 1922, are combined in the official flag and slogan recently adopted by the city of Astoria, Ore.

The boundary line between the states of Washington and Oregon is formed largely by the Columbia River, at the mouth of which Astoria is located. Some hundred miles inland, railroads and state highways line both banks of the river. It was appropriate, therefore,



ASTORIA'S NEW CITY FLAG

that the City Council should adopt as the city's slogan, "The Gateway to the Northwest."

The municipal flag, designed by O. A. Kratz, City Manager, is symbolic of the city's slogan and commercial resources. The white bars at the left represent an open gate or gateway, a sign of welcome. They are on a red field, commemorating the fire of December 8, 1922, which destroyed the entire business district of the city. The right half of the flag shows a white ship on a blue background, representing Astoria's marine industry—fishing and shipping.

RURAL SCHOOLS AND COMMUNITY ORGANIZATION

The consolidated school, through its clientele of teachers, pupils, and patrons, furnishes the best basis possessed by many rural communities for the complete organization of community interest.

—*Augustus W. Hayes.*

"Economical"

"Our Best 'Sixty' has revolutionized our cost of road construction and maintenance," writes the engineer of a Colorado County where the Best has been used for pulling scrapers, elevating grader, scarifier and snow plows. "In fact, it has never failed in anything we have asked it to do and has been very economical both as to repairs and operation."

Investigation of the work of Best "Sixties" and "Thirties" on any job will prove worth your while. A list of owners will be sent on request.

Factory Branch—Warehouse
St. Louis, Missouri

SALES OFFICES

San Francisco
127 Montgomery Street

New York City
30 Church Street

C. L. BEST TRACTOR CO.

General Office—Factory
SAN LEANDRO, CALIFORNIA

94a-1123

BEST TRACTORS

When writing to Advertisers please mention THE AMERICAN CITY—Thank you.

A New Incentive for Acquiring Land for Playgrounds

THE Harmon Foundation has just announced on behalf of its founder, William E. Harmon, an offer to secure and present during the current year fifty playground sites to growing towns, small cities, and suburbs of larger cities with at least 3,000 population which have grown at least 30 per cent since 1900. All applications to participate in this gift must be endorsed by the mayor of the town or president of the school board and must be received not later than July 1, 1924, by the Division of Playgrounds, Harmon Foundation, Inc., 140 Nassau Street, New York, N. Y.

Not more than $2,000 will be available for any one town and in no case will less than two acres of land be purchased. This obviously eliminates from consideration a large number of valuable and much needed play sites. It is the desire of the Foundation, however, to use the limited funds at its disposal to encourage play land acquisition in growing towns where the need is not yet acute and yet where such land will eventually be in great demand.

The formal application blank will be sent upon written request to the Foundation, and provides for a proper appraisal of the land, resolution on the part of the city officials to equip and maintain the playfield adequately, evidence that the title is clear or can be made so before the taking of title, and evidence that an option can be secured for a sufficient length of time to complete arrangements for the purchase.

Examination, choice of sites and securing of titles will begin immediately on the close of the offer, but, judging from the exprience of giving eleven playgrounds in Ohio during 1923, it is expected that the remainder of the year 1924 will be consumed in concluding transactions and delivering titles.

Aids for Better Homes Week, May 11-18

UNDER the leadership of Better Homes in America, an educational, non-commercial corporation recently formed, with Herbert Hoover as President and Dr. James Ford, now on leave of absence from Harvard University, as Executive Director, plans are going forward for a nation-wide observance of the week of May 11-18 as Better Homes Week.

One definite objective will be the inclusion in high school curricula of required courses in home-making and the care of a home. The one sure product of every school is an army of men and women who will head homes, yet for this most important function in life there is often not even a pretense of practical training. A host of simple but collectively important ways to improve small homes are being recommended by the group behind the new organization, who aided informally in the setting up of approximately 1,000 Better Homes exhibits in 1923.

Here are some of the prosaic bits of advice: Put the kitchen sink under a window so that the home-maker may enjoy the fresh air and the beauty of nature while engaged at necessary household tasks.

Put rollers on the kitchen table and save about fifteen miles of walking a month for the housewife.

Place your bed in relation to the bedroom windows so that you can have plenty of fresh air without a draft.

Dedicate the sunny south bedroom to your children instead of to occasional guests.

Build your house so that the living-room and dining-room constitute one big room. Then your daughter can have dances, parties and other social events at home instead of somewhere else.

Give the housewife the share of the living expense money which should come under her jurisdiction, and let her be responsible for the budgeting of it.

There are scores of further recommendations. Books, music and other cultural features of the home are included in the specifications, as well as things physical. A determined effort will be made to see that every American knows what constitutes the best, most livable home his money can assure. The headquarters of Better Homes in America, from which local committees can secure printed matter and other aid are at 1653 Pennsylvania Avenue, Washington, D. C.

A New Public Service Building for Pittsburgh

OPERATION headquarters for almost all the public utilities of the city will be accommodated in the new Public Service Building now under construction in Pittsburgh. The new structure, with a frontage of 85 feet on Sixth Avenue and extending 240 feet along William Penn Way, will house the activities of the Philadelphia Company, Equitable Gas Company, Duquesne Light Company, Pittsburgh Railways, Allegheny County Steam Heating Company, and various other affiliated corporations.

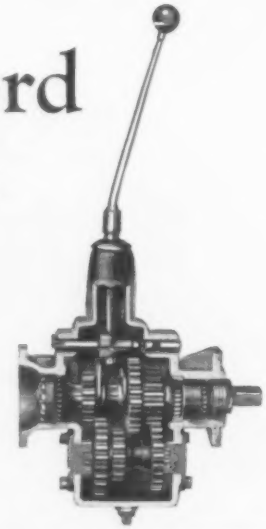
An important street improvement will accompany the erection of the building—the widening of William Penn Way to 50 feet, through to Seventh Avenue, thus giving the structure a frontage on a wide thoroughfare which will be the automobile highway across town between Grant and Smithfield Streets. Among the many modern features of this new Public Service Building will be an auditorium with about 700 seats for meetings of interest to the employees, for various events of the employees' organizations and gatherings of a similar nature.

Effective Aid Available for Municipal Health Departments

THE Committee on Municipal Health Department Practice of the American Public Health Association is now prepared to offer to the larger cities of the country the services of its Field Director, Dr. W. S. Ran-

Makes Your Ford A Two-Ton Truck

Six Speeds for Your Ford



Two-ton ruggedness is built into the Ford truck.

Two-ton power is supplied by the famous Ford engine.

The Warford Auxiliary Transmission forges the link between the two, which makes the Ford truck a distinctively economical two-ton haulage unit.

The Warford-equipped Ford, with a speed for every condition of road and load, hauls with the best of them through heavy going and passes the rest of them on good roads.

Warford couples bull-dog strength and speedwagon fleetness with Ford dependability and economy.

If your Ford dealer hasn't the Warford transmission, write for our dealer list.

What the Warford Is and What It Does

The Warford Auxiliary Transmission is a high-grade gear shift of the approved sliding gear selective type which gives the Ford six speeds forward and three reverse.

The Warford transforms engine revolutions into rear axle torque at six different ratios, from 36 to 1 in low, to 5 to 1 in high, allowing the engine to run at normal speed whether the truck is traveling one mile an hour or thirty.

In adapting normal engine speed both to heavy hauling and high speed, the Warford saves wear and tear, loss of power and waste of gas and oil, caused by the racing motor.

Warford

AUXILIARY TRANSMISSION

The Warford Corporation, 44 Whitehall Street, New York

When writing to Advertisers please mention THE AMERICAN CITY—Thank you.

kin, as a consultant on health department organization and practices.

Dr. Rankin is in possession of an immense amount of information which the Committee on Municipal Health Department Practice has collected during the last three years. He also knows the opinions of the Committee with reference to various phases of the municipal health problem, and—what is of even greater importance—is familiar by first-hand contacts with city health officials and with their ideas and methods of work. The Committee believes that, through this clearing-house service which its Field Director is rapidly developing, the Association is now in a position to be of very definite help to cities that may desire to know what other cities are doing and what measure of results they are obtaining in municipal health department practice.

Full details can be secured from Homer N. Calver, General Secretary, American Public Health Association, 370 Seventh Avenue, New York.

A New Town in Canada

THE town of Jasper, which is the administrative center of the largest of Canada's national parks, lies on a gravelly bench about two miles long and half a mile wide and approximately 60 feet above the river. To the north and west there is a steep hill two or three hundred feet high, and beyond this there is a rolling plateau about two miles in width. On the north this plateau commences below a shoulder of Pyramid Mountain, reaching eastward toward the railway. From here it extends southward and, swinging to the west above Jasper, parallels the valley of the Miette for about ten miles. One of the most noticeable features of this plateau is the number of small lakes and ponds scattered over it, many of which are well stocked with fish. Chief among these are Pyramid, Patricia, Cabin, and Caledonia Lakes. On the opposite side of the river there is a wide flat extending north beyond Maligne River. On this flat there are also a number of very attractive lakes, the more important ones being Beauvert, Annette and Edith Lakes.

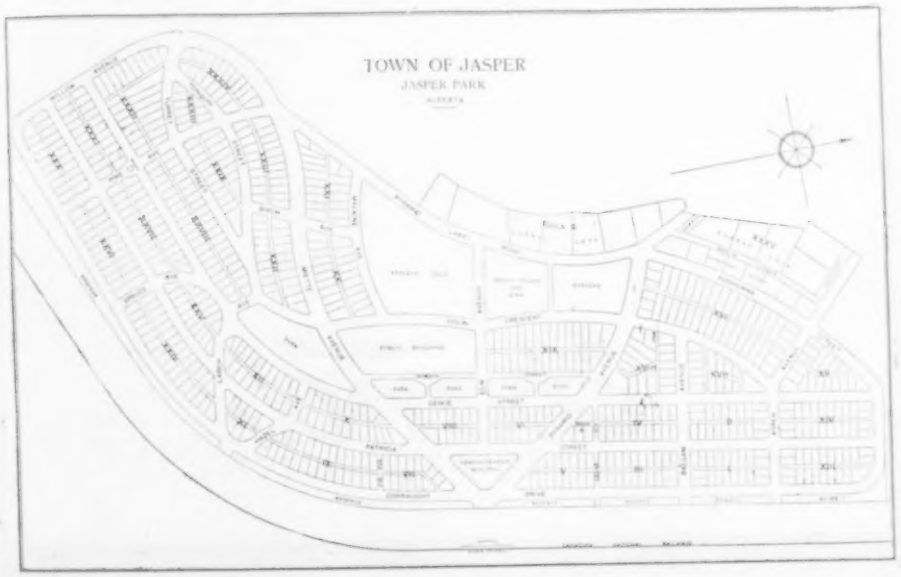
The plan of the town was made by Thomas Adams in consultation with Dr. E. G. Deville. Jasper is now a well-built-up and flourishing community. A reproduction of the plan is here presented.

—From *The Journal* of the Town Planning Institute of Canada.

Three-Day School for City Officials

THE University of Kansas announces an exceptional program for its third annual three-day school for city officials, to be held at Lawrence, April 15-17. The most important new feature will be the actual laboratory work done by those attending the school. In the bacteriological laboratory, media will be provided the first day, and each one will plant at least one sample of water. Readings will be made and the analyses completed the second and third days. In the chemical laboratory, tests will be made to determine the temporary and permanent hardness of various waters, also tests for iron, salt and other chemicals. Another new feature of the school this year will be the use of moving picture films illustrating various phases of the work.

Special attention is to be given to problems of water superintendents and commissioners. Methods of computing rates, fire insurance requirements, the adaptability of different kinds of pumps, water purification, sewage disposal,



The new Ford all-steel body and weather-proof cab mounted on the Ford worm drive chassis at $490 f. o. b. Detroit, is the world's lowest priced complete one-ton truck.

A Preference Based on Quality

There is deep signficance in the fact that 78% of all the trucks of one ton or less capacity in the United States are Fords. This overwhelming preference for Ford haulage units has its basis in the low cost of Ford transportation, the rugged construction of the truck itself, and its unusual adaptability to every line of industry.

Mechanical excellence, simplicity of design and ample power are further factors that have contributed to the popularity of the Ford One-Ton Worm Drive Truck.

As a logical step in providing dependable transportation at the lowest possible cost, the Ford Motor Company is now producing an all-steel body and steel weather-proof cab mounted on the Ford Truck Chassis, selling at the remarkably low price of $490.

Merchants standardizing their delivery systems on Ford One-Ton Trucks have available the facilities and assistance of over 33,000 Authorized Ford Service Stations, conveniently located to their business.

FORD MOTOR COMPANY
Detroit, Michigan

See the Nearest Authorized Ford Dealer

Ford
CARS · TRUCKS · TRACTORS

V-5

and the treatment of industrial wastes will be discussed in non-technical language.

Any municipal official or employee in Kansas may attend the school without registration or tuition fee.

Orientation of Baseball Fields

AS engineers on a park for the borough of Vandergrift, Pa., Blum, Weldin & Company, of Pittsburgh, secured information as to the orientation of various baseball fields throughout the eastern end of the United States.

Believing that some of this information will be of value to readers of THE AMERICAN CITY, it has been made available in the accompanying chart, in sending which Louis P. Blum writes:

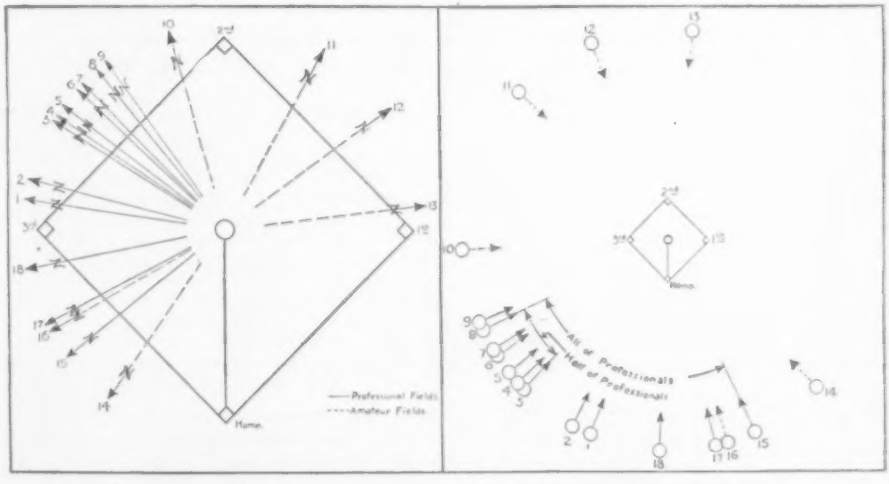
"This drawing shows the meridian as it exists upon some of the National League ball diamonds and also upon certain diamonds laid out by various town planners. To the right of the chart is shown the direction of the sun's rays at 7 P. M. of August 1, the time when the twilight sun is most troublesome to ball players. The sun's azimuth at that hour was obtained from the Director of the Allegheny Observatory.

"There seems to be no set rule for the orientation of baseball diamonds, each one apparently being laid out to conform to the available area, to the most advantageous position of entrances and exits, to the best relation to grand stands and to various other factors which might rule any individual case. It is noticeable, however, that all the professional baseball fields are laid out with the meridian practically in the one-quarter, or in such a position that the sun favors the batter and is most troublesome to the right fielder and first baseman, these players being the ones who ordinarily receive fewest batted balls. This arrangement also agrees with the opinions of several authorities whom we consulted."

A letter to Blum, Weldin & Company from the American Sports Publishing Company is quoted as follows:

"It is the custom at baseball parks where there are to be paid admissions to lay out the ground so that the high-priced seats shall be in the shadow in the afternoon. This usually results in the pitcher's throwing the ball to the west and puts the left fielder and the center fielder in the sun. Sometimes a park is laid out to accommodate itself to the street-car lines, and then little heed is paid to the spectators. They sit in the sun.

"The ideal way for play is to have the home plate in such a position that the batter is out of the sun and the pitcher throwing the ball across the sun. Some one will have to face the sun on any ball field. It is better to have a sun outfield than a sun infield. That is really the plan on which to go. Adapt your ground the best way you can to use all of it to good advantage, but take care of the infield as much as possible."



DIRECTION OF MERIDIAN IN VARIOUS BASEBALL FIELDS

DIRECTION OF SUN'S RAYS, AUGUST 1, AT 7 P. M.

1. New York, Yankee Stadium
2. St. Louis, American and National Leagues
3. Philadelphia, National League
4. Philadelphia, American League
5. New York, Ebbets Field
6. Cleveland, National League
7. Chicago, American League
8. Chicago, National League
9. Vandergrift, Pa., Adopted by Borough Council
10. Cambridge, Mass., Harvard University
11. Lewiston, Pa., Dickson Field
12. Millvale, Pa. (Amateur)
13. Bellevue, Pa. (Amateur)
14. Pittsburgh, North End (Amateur)
15. Washington, American League
16. Pittsburgh, North Side Board of Trade
17. New York, Polo Grounds
18. Pittsburgh, National League

Safeguard the City's Buildings, the Grounds and the Children with a Stewart Chainlink Protection Fence.

STYLE NO. OT266—All Galvanized

Protection - Beauty - Permanence

THE advanced ideas in construction of the Stewart type of Chainlink Protection fence makes it the ideal fence for municipal water works, sewage disposal plants, parks, playgrounds, golf courses, tennis courts. Made of genuine open-hearth galvanized fabric with interlocking mesh; fittings of pressed or forged steel, it combines protection with beauty and permanence.

We also manufacture Balcony Railings, Grilles, Wire and Iron Window Guards, Bridge Railings, Miscellaneous Wire and Iron Work.

Ornamental Iron Fence and Gates

For forty years we have been leaders in the manufacture of iron fence; hundreds of city and municipal cemeteries are among our thousands of installations. Stewart's Iron Fence and Gates are equally popular for town houses, suburban homes, country estates, and other properties where the highest type of enclosure or entrance gateway is required.

SAVE MONEY FOR THE CITY BY GETTING OUR PRICES ON PARK SETTEES.

Let us know your requirements in either Iron or Chainlink Wire Fence and we will submit designs and estimates of cost

THE STEWART IRON WORKS COMPANY.
216 Stewart Block, Cincinnati, O.

"The World's Greatest Iron Fence Builders"

Employment Statistics for Cities

SOCIAL workers and others have urged the necessity for providing, in the development of employment, statistics for the publication of data by cities. Employment conditions differ widely between cities, and figures for entire states or larger areas are of comparatively little use for indicating changes in trends in particular cities.

The following list shows the cities in the United States and Canada for which monthly employment statistics based on employers' payroll reports are now being made available, and the agencies publishing the figures:

Cleveland Chamber of Commerce: Cleveland

Detroit Employers' Association: Detroit

Illinois Department of Labor: Chicago, Aurora, Bloomington, Cicero, Danville, Decatur, East St. Louis, Joliet, Moline, Peoria, Quincy, Rockford, Rock Island, Springfield

Massachusetts Department of Labor and Industries: Boston, Brockton, Cambridge, Fall River, Fitchburg, Haverhill, Holyoke, Lawrence, Lowell, Lynn, New Bedford, Peabody, Springfield, Taunton, Worcester

Canadian Bureau of Statistics: Montreal, Toronto, Ottawa, Hamilton, Winnipeg, Vancouver

The Federal Reserve Bank of Philadelphia has recently published monthly employment statistics for twenty-two cities in the Third Federal Reserve District. The bank has now, in cooperation with the three state departments of labor, extended the collection of employment statistics to cover all of Pennsylvania, New Jersay and Delaware.

The New York Department of Labor is now preparing to extend its analysis of local employment trends, and within a few months it will make available separate figures for the following industrial centers: New York City, Albany (including Schenectady and Troy), Utica, Syracuse, Rochester, Buffalo, Binghamton.

—From *The Compass* (monthly bulletin of the American Association of Social Workers).

The Function of One-Way Streets

THERE seems to be a good deal of misunderstanding about the function of one-way streets. This method was originally designed to increase the capacity of narrow roadways where the width was not right for an even number of traffic lanes—two, four, or six lines of traffic. In such cases, one-way operation brought more effective use of the given roadway by securing an extra lane or odd number—three, five—in the desired directions. One-way operation was not originally intended to be applicable to wide streets suited to the requisite number of traffic lanes in two directions. Especially is this the case where the distribution of traffic streets is uneven, making necessary long detours to move in the desired direction. One-way streets likewise tend to concentrate movement in the morning at one series of points and then in the evening at another, instead of distributing traffic at all times. The system is clearly a makeshift—not a cure, and must be applied with extra precaution or the congestion it sought to avoid will simply be transferred to another point.

—From "Memorandum on Traffic and Transportation, District of Columbia," to the Senate Committee on Traffic Inquiry, November 19, 1923, by J. Rowland Bibbins, consulting engineer, Washington, D. C.

The Tumor on the City

COMMUNITIES which think only of growing bigger are looking at only one side of community life and development—and perhaps not the most important side either—the workers in the field of rural social organization at the State Agricultural College at Ithaca point out in calling attention to an article by Dr. David D. Vaughan of Boston University. In the article, Dr. Vaughan first asks if one can estimate the worth of a man by his size, if one can estimate the man's value to society by the scales? "If a man developed a fifty-pound tumor would he boast of it?" continues the writer. "Some towns are foolish enough to boast of increasing population when the citizens added are a liability instead of an asset. They may offer an opportunity for missionary work and for Americanization classes, and they may furnish occasion for careful planning by religious and educational leaders, but often they are hardly a basis for flamboyant boasting. The size of a city may be increased by a slum population, but not the real worth of the city.

—*State Service* (New York).

Arrests in South Bend—A Seven-Year Comparison

To the Editor of THE AMERICAN CITY:

The following report of arrests made in the city of South Bend for the year 1923 in comparison with those of the six previous years may be of interest to the readers of THE AMERICAN CITY:

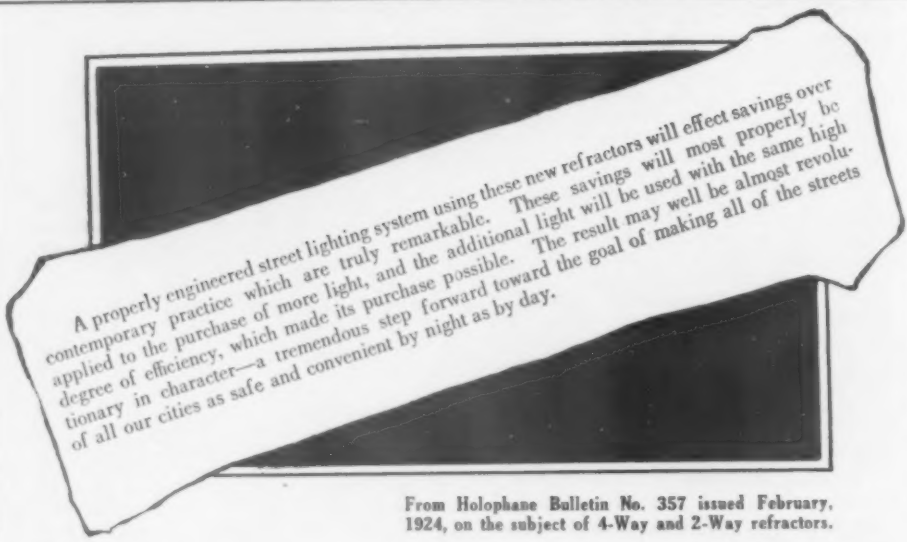
Year	Total Arrests	Drunks
1917	3,835	1,304
1918	2,441	492
1919	1,715	171
1920	1,911	227
1921	2,681	495
1922	5,419	1,506
1923	6,903	2,096

You will notice the great increase in the total number of arrests and in the number of arrests for intoxication for the years 1922 and 1923. The conclusion might be drawn from these figures that lawlessness and intoxication are increasing in this city, but the correct deduction to be drawn from them is that a reorganized and revitalized Police Department has been on the job.

ELI F. SEEBIRT,
Mayor, South Bend, Ind.

EDUCATION FOR HEALTH

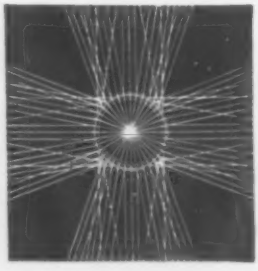
will help to solve the problems of social hygiene. The creation of fear through the exploitation of disease will accomplish little or no permanent results for good.—*Bulletin of Division of Health, Dayton, Ohio.*


A properly engineered street lighting system using these new refractors will effect savings over contemporary practice which are truly remarkable. These savings will most properly be applied to the purchase of more light, and the additional light will be used with the same high degree of efficiency, which made its purchase possible. The result may well be almost revolutionary in character—a tremendous step forward toward the goal of making all of the streets of all our cities as safe and convenient by night as by day.

From Holophane Bulletin No. 357 issued February, 1924, on the subject of 4-Way and 2-Way refractors.

Nearly every city in the United States is still far from the ideal of fully adequate street illumination throughout the entire city. The new Holophane 4-Way and 2-Way Refractors make this ideal attainable at a lesser increase over present costs than would otherwise be possible.

More light on the street for the same money—that is the obvious advantage of the new equipment; but a careful analysis of the cost of street lighting service shows ***two other distinct*** and ***important gains.*** Holophane Bulletin No. 357 just off the press tells you about them. Write for your copy.



Horizontal Section Showing the Action of the Vertical Prisms of the Holophane 4-Way Refractor.

Holophane Glass Company, Inc.

342 Madison Ave., New York Works, Newark, Ohio.
In Canada, Holophane Co., Ltd., 146 King St. W., Toronto

HOLOPHANE

DIRECTS LIGHT SCIENTIFICALLY

WARNING—Spring Floods May Contaminate Water-Supplies

UNDER this heading the New York State Department of Health in its *Health News* for March 10, 1924, issues the following timely suggestions for water-works officials:

"Water-works officials should be on their guard at this season of the year against the danger of contamination of water-supplies during freshets and flood conditions.

"Floods in water-supply streams may soon be brought about by spring rains and melting snow and ice. During these flood periods the contamination of streams is relatively more serious than at seasons of low flow. Accumulations of filth and washings from animal enclosures, privy vaults and cesspools will be carried by surface wash into the watercourses. Rapid stream flow will carry such contamination to water-supply intakes comparatively quickly, and consequently the danger of contamination is correspondingly greater, especially if the reservoirs are low or nearly empty. In the case of ground water-supplies unusual hydrostatic conditions may bring about contamination of springs or wells unless precautions are taken to guard against such pollution.

"It is therefore urged that water-works officials make every effort to minimize and prevent the contamination of their supplies. Watersheds should be carefully inspected and, if possible, premises thereon placed in such sanitary condition as to preclude the entrance of infected material into the streams. Water purification plants should be carefully looked over and placed in perfect condition in order that they may be ready to meet the extra burden during periods of turbid and possibly infected water.

"Should there arise any question as to proper measures for adequately protecting the sanitary quality of any water-supply [in New York State], this Department should be notified at once in order that it may render such assistance as lies within its resources, either in the matter of advice or in the installation of emergency sterilization plants."

Kansas City Elects Commission Pledged to Council-Manager Form

AT a special election held in Kansas City, Mo., February 26, a charter commission was elected pledged in advance of election to draft a council-manager charter embodying the principles outlined in the item on page 217 of THE AMERICAN CITY for February, 1924. The Chamber of Commerce was one of the first organizations to endorse the movement for a new charter and has been very active in the campaign since its inception about eighteen months ago. The movement had the backing of most of the civic organizations and the Central Labor Union. Although the charter commission has a year in which to finish the drafting of the charter and to submit it to the voters, it has already effected an organization and is getting down to the work of charter drafting.

The Municipal Bond Market

By Sanders Shanks, Jr.

Editor, *The Bond Buyer*

THE month of March was a slow one for the municipal bond market During the early part of the month there were an unusually small number of municipalities in the market for funds. The largest offering of the month which is scheduled at a date later than the time of this writing is a $10,000,000 block of Soldiers' Bonus bonds of the state of Illinois. These bonds will bear 4½ per cent interest and mature over a period of twenty years. This state has already sold $40,000,000 of the total authorized issue, which is $55,000,000.

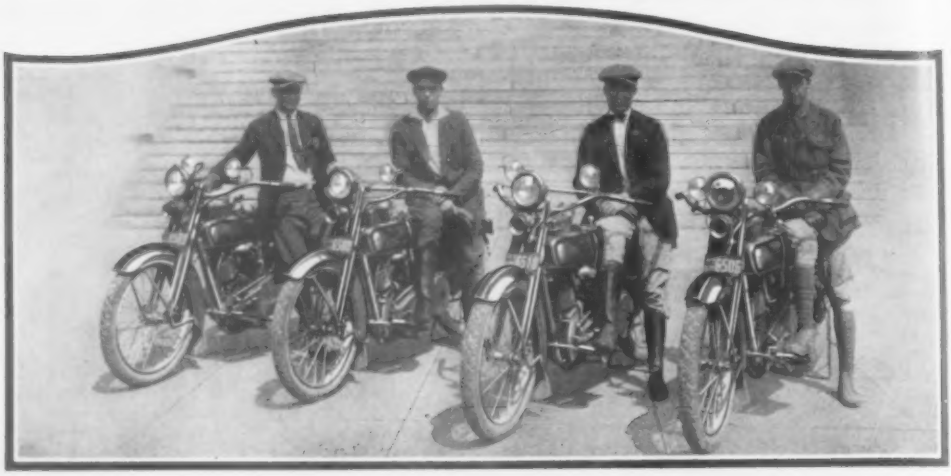
The state of California is offering on the same day $4,000,000 of its authorized $10,000,000 Soldiers' Bonus bonds. These bonds will also bear interest at the rate of 4½ per cent.

The entire market is looking forward to the New York State Soldiers' Bonus offering, which is scheduled for April 8. There are $45,000,000 of these bonds, which will bear 4¼ per cent interest and mature serially in 1 to 25 years. Long-term New York State bonds have recently been selling on a 4 per cent basis. At present, it seems as though dealers will be able to handle this large issue at a fair profit.

With Congress apparently in no disposition to materially reduce tax rates, tax-exempt state and municipal bond prices are firm. Experts express the belief that this class of securities has in recent months discounted adoption of the Mellon surtax rates and, if that schedule is voted against in Congress, tax-free bonds should enjoy a renewed demand among wealthy private investors. At the moment, however, the bond business is unusually inactive and will probably continue so until uncertainty regarding tax legislation is removed.

IMPORTANT SALES DURING MARCH

Amount	Borrower	Maturity	Coupon Rate (%)	Net Yield (%)
$ 540,000	Hartford Co., Conn.	1925-44	4½	4.06
1,000,000	Northampton Co., Pa.	1934-54	4½	4.22
500,000	Denver, Colo.	1934-38	4½	4.41
725,000	Atlantic City, N. J.	1925-64	4¾	4.63
2,000,000	Dallas, Tex.	1925-64	4½	4.64
750,000	Flint, Mich., Union School District	1924-54	4¾	4.68
800,000	Canton, O.	1925-48	5	4.81
655,000	Chattanooga, Tenn.	1928-37 & 1954	5	4.83
950,000	Black Hawk Co., Ia.	1927-39	5	4.97
634,000	Miami Beach, Fla.	1926-41	5½	5.37



Less than 2¢ per mile!

SPOKANE COUNTY, WASHINGTON, reports that each of the above four Harley-Davidsons has been driven 20,000 miles and that "the total operating cost has been less than two cents per mile, including depreciation."

Over 1500 cities, towns and counties use Harley-Davidsons for police service. For pursuing motorized crooks and "booze-runners," for enforcing speed and traffic laws, and for a variety of service duties, the Harley-Davidson is the most efficient, dependable and economical mount known—universally recognized as "America's Police Motorcycle."

Lightweight alloy pistons—smoother power—less vibration. Alemite lubrication—first on any motorcycle. Full-floating sidecar—49-inch semi-elliptic springs. Handsome olive green finish, maroon striped.

Your city needs motorcycle protection this coming Summer. **Now** is the time to get the facts. Write for free, special literature on Police Motorcycles. Or, see your local dealer.

Harley-Davidson Motor Co.

Dept. M. **Milwaukee, Wis.**

Harley-Davidson
The Motorcycle

From the International Union of Cities

City Smoke and Infant Mortality. 61.471.5 - 413.2 (42)

A bulletin of "the International Society for the Protection of Children" calls attention to the fact that the rate of mortality due to maladies of the respiratory organs is much greater in cities where there is much smoke, as Manchester and Sheffield in England. At Leeds, after six days of thick fog, infantile deaths rose from 50 to 175. A deputation representing eleven organizations devoted to the protection of health and the bettering of social conditions, has submitted to the Ministry of Health its views concerning the danger arising from excessively bad smoke conditions in English cities.

Housing Colonies for Families with Children, Belgium. 71.43 (493.1)

The movement for better housing at Anderlecht was begun in 1907. It devoted its efforts and its resources (very slight up to 1920) to the improvement of old or the construction of new lodgings, 120 having been built up to that date, under the Belgium law of 1889. In 1920, upon the formation of the Société Nationale des Habitations á Bon Marché, the Anderlecht movement joined this national organization, and under the effective guidance of Mr. Melckmans, its energetic president, with grants from the above-mentioned national society, the local society has now undertaken the construction of 1,350 houses, arranged in two garden suburb groups, on the outskirts of Anderlecht, an important district of Greater Brussels. The two tracts together have an area of about 75 acres. The houses are mostly single-family row houses, and have been reserved for families having at least three children.

Ring Road and Other Street Work, Sheffield, England. 71.5 (42.74)

An important new system of main highways has recently been built at Sheffield. These aggregate 10 miles in length and are from 80 to 100 feet in width. An important feature of the project is a "Ring Road" surrounding the city. The entire work has cost the community approximately £275,000. The projects have been undertaken for the purpose of furnishing work to the unemployed.

Unusual Bathing Pool Construction for Tynemouth, England. 61.347 (42.82)

The city of Tynemouth, as its name indicates, on the ocean near the mouth of the river, has recently completed a new public bathing pool, which is to be emptied and refilled automatically without pumps, at low and high tides. There are to be seats for spectators. The estimated cost is £70,000.

A Museum to Aid Housing and Town Planning in Austria. 71.43 (43.6) (074)

An effort is being made by the Austrian Union for the Development of Housing Colonies, to found a museum which will include city planning, housing and allied subjects. An appeal has been made for funds, as well as for models, reproductions, plans, books, samples of material, etc. The purpose of this museum is to be educational and to show all classes of the people the significance and importance of housing colonies, from the points of view of economy and of social and intellectual phases. Traveling exhibits will be sent about into towns and villages, including selections from the material collected in the museum. Furthermore, they hope to give in the schools, lectures illustrated by lantern slides and films. The extraordinary interest that the public has shown this year in the exhibits already made, not only in Vienna, but in the Federated States, justifies the belief in the value of such a permanent museum.

Parks and Open Spaces, Milan, Italy. 71.6 (45.21)

Engineer P. Mezzanotte has made an appeal to the Engineering College of Milan, strongly urging that the speculative builder be prevented from covering with apartment houses and other structures the little that remains of the open land in the central portion of the city of Milan, and also urging the preservation of the few private gardens which still remain in that city, already too densely crowded. A similar problem exists in most modern cities. It is here proposed to indemnify or reimburse the proprietors of such gardens and open spaces for holding them free of building. A means of accomplishing this is to be found in the preferential application of building regulations and ordinances.

Housing and City Planning in England. 33.332 + 71 (42)

Many local activities are going on along these lines in various parts of England. The city of Brighton has just submitted to the Ministry of Health (the controlling governmental authority in such matters) a project for the acquisition of recreation grounds for children and adults, with the request for permission to borrow money for the grading of the land. The City Council of Halifax has just approved the submission of a request for permission to construct 73 houses at a total cost of £38,000. Northampton has just taken the same step in regard to the construction of 102 houses to cost 45,000 pounds. At Sheffield, a credit of £10,000 has been voted for the purpose of installing electric lighting systems in workmen's

HOLLOWSPUN
LIGHTING STANDARDS

An Asset by Day as Well as by Night.

THE North Shore Park Board in Chicago had estimates on the cost of lighting a section of boulevard to the standard followed in previous park and boulevard lighting in the city. This system had little to recommend it from the standpoint of light distribution, permanence or day time appearance.

Investigation showed that a modern system providing 70% more light at the street surface, and using Hollowspun reinforced concrete standards—permanent and pleasing in architectural design—could be installed for less money.

This installation is attracting wide-spread attention, both for its night time efficiency and its day time appearance. Full details in "Hollowspun Standard" No. 11.

MASSEY CONCRETE PRODUCTS CORPORATION
Peoples Gas Building Chicago

homes. The delegates from 44 communities in the vicinity of Halifax have agreed to the formation of a regional committee to study the plan of this entire district, not wholly for the immediate execution of the work, but with the broad purpose of securing greater economy and better future developments. The city of Wigan has decided to prepare a city plan.

A Thames Boulevard Near Chiswick, Eng. 71.6 (42.1)

Chiswick, a suburb to the west of London, was in a fair way of becoming an industrial center, but the local authorities, preferring to preserve its rural character, have set aside fine, broad open spaces, along the Thames River. Plans for the development of this great area into a boulevard and parks are now being prepared by experts.

Housing Crisis in Germany. 33.332 (43)

Four proposals have recently been formulated to help solve the housing crisis in Germany. The first suggests building operations to be conducted by individuals. By this means it is believed the cost of construction should be reduced to a reasonable price. The second method would provide that in each community the economic organizations, industrial, commercial, etc., should be placed under obligation to build. The third method suggests a special tax on unmarried and young men as a means of benefiting the housing situation. The fourth provides for housing construction based upon supplementary or overtime voluntary work of employees and workmen. To these should be added the proposal of ceding lands at reduced prices by the State, preferably by what is known as emphyteusis—an ancient form of contract, to improve lands and thereby gain practical possession.

Housing in Austria. 33.332 (43.6)

Extensive building operations are being undertaken by the city government of Vienna, which has decided to construct annually during the next five years, through the expenditure of 400 million crowns, 25,000 houses, as well as a corresponding number of industrial establishments. These new houses, it is expected, will in five years make up the present housing shortage. The 400 million crowns required will be obtained, not by loans, but by regular municipal receipts from taxation and other sources.

House Rents, Holland. 34.743.33 (492)

Rents demanded for houses constructed from subsidies of the Dutch Government, it is claimed, are too high, not only with reference to the earning capacity of the occupants, but also as compared with the "norm" established by the Department of Labor. At present the rents amount to from one-fifth to one-fourth or even one-third of the wages of the occupant, while the "norm" above referred to is only one-seventh or one-sixth. A thorough inquiry has been made on the subject by a political association, and an urgent request made to all building asociations that they aid the movement to the extent, at least, of filling out the questionnaire sent them in order that action may be addressed to Parliament urging a revision of the present Government policy.

Slum Removal, Manchester, England. 61.358 (45.72)

The Ministry of Health has just approved a project for Manchester, England, which involves the demolition of an entire street (199 houses). The occupants will be rehoused in new lodgings. The cleared land will be rearranged to provide for open spaces and for commercial and industrial structures.

Housing and Public Health in Italy. 61.358 (45.21)

The "Institute for the Erection of Low-priced Houses" at Milan, being obliged to demolish two crowded slum sections of that city, has organized the reconstruction so that it may be accomplished progressively, block by block, utilizing for temporary structures open spaces, such as gardens and rear yards. By this means the inhabitants will be able to occupy temporary lodgings near their old homes up to the time of moving into the new lodgings.

Standardized Forms of Metallic Construction, Germany. 62.495 (43)

The Hanover Committee appointed to study forms of metallic construction, has completed the problem of standardization of iron or steel window-frames, and has published proposals for metallic framework for walls. It is preparing, furthermore, for a still greater degree of standardization, including roofs and roofing tiles, ventilators, lighting arrangements and foundations.

Garden Cities and Housing Groups in the Department of the Seine, France. 71.313 + 71.43 (44.361)

A number of organizations, official and semi-official, were occupied even before the war, and especially since, with the problem of meeting the pressing needs for more and better housing for the enormous population of Paris and its suburbs. Among these organizations are The Office of the Department of the Seine for Inexpensive Homes, the City of Paris, the so-called "Assistance de Paris," and both the Rothschild and Lebaudy Foundations. Garden cities and other groups to the number of seventeen, each of from 150 to 1,300 houses, or lodgings, have already been built, great care being taken in each case to provide for health, comfort and beauty of construction, and of general arrangement. Among those now completed or nearly completed are those known as Les Lilas, Drancy, Dugny, Stains, Suresnes, Blessis-Robinson and Malabry. The net cost of these lodgings, including all improvements, varies from 25,000 to 36,000 francs.

Compact arrangement of cutting units makes control easy.

Two views showing how units are pushed —not pulled, the lifting arrangement and absence of weight on cutting units.

"Bulldog" Cutting Units—Why Say More?

We might talk about their Timken Bearings, Alemite lubrication, double-locked adjustments, drop-forgings and special steels—but why? During the past three years the mere name "Bulldog" has come to mean all these things and more. That name means service that three years ago was considered impossible, and today is found in the "Bulldog" alone.

Now "Bulldog" cutting units have been combined into a five unit mower with added advantages as outstanding as those of the units themselves. It can be hitched to ***any*** tractor without alterations in two minutes. No weight rests on the units—it is carried by wide-faced wheels. The cutting units can be ***quickly*** raised off the ground. The turning radius is short and it can be ***backed*** any distance.

Buy grass cutting equipment in the same level-headed way that you would a motor car. Investigate them all but let the engineering features and proven performance be your guide. The "Bulldog" welcomes comparison. Write.

Ideal Power Lawn Mower Co.

R. E. Olds, Chairman

400 Kalamazoo Street, Lansing, Michigan

NEW YORK, 13-19 Hudson Street — CHICAGO, 11 East Harrison Street

Dealers in all Principal Cities

IDEAL Bulldog MOWERS

3 and 5 Units

Municipal and Civic Publications

Prices do not include postage unless so stated

Government and Politics of Belgium.—By Thomas Harrison Reed, A.B., LL.B., Professor of Political Science, University of Michigan. World Book Company, Yonkers-on-Hudson, N. Y. 1924. XV + 197 pp. $1.60.

A review of the essential features of Belgium's governmental organization and party system. Among the features which make this study interesting and valuable are: extensive experience with proportional representation in selecting a national legislature; the testing of simple universal suffrage and universal suffrage with additional votes for wealth and capacity, also the successful application of compulsory voting; abnormally developed party politics; and an original type of municipal administration.

Preliminary Report by the Washington Committee of 100 on the Federal City to the American Civic Association.—Illustrated. 97 pp. Apply to the American Civic Association, 905 Union Trust Building, Washington, D. C.

This Committee was formed to forward the physical development of Washington and to present to the nation at large through the American Civic Association the present status and future needs of the city. Full information is given as to its formation and recommendations, and reports of subcommittees are included on architecture, forest and park reserves, school sites and playgrounds, housing, zoning, street, highway and transit problems, extensions of Metropolitan Washington, water-front development, and industrial development and limitation.

The American Community.—By James Albert Woodburn, of Indiana University, and Thomas Francis Moran, of Purdue University. Longmans, Green and Co., New York. 1924. XLVIII + 455 pp. Illustrated. $1.48.

An elementary text in community civics, emphasizing the essentiality of community spirit and the obligations which it involves. These obligations are presented in great detail, with a constant appeal to fairmindedness and team-play, and with topics, questions and references for students of elementary and secondary schools. The arrangement of the material and its quality imply the increasing maturity of the student, leading him to the full comprehension of his rights and duties as a citizen.

Safety First for School and Home.—By Harriet E. Beard, A.B., Supervisor of Education, Public Schools, Detroit, Mich. The Macmillan Company, New York. 1924. VIII + 223 pp. $1.28 postpaid.

This book shows the great need for safety education, and presents the principles that underlie accident prevention in streets and homes, explaining how to remedy conditions that cause accidents, and how to teach and train young children systematically in habits of carefulness. It is full of interesting and practical details. Part II is devoted to the teacher's part of the work, from the kindergarten through the eighth grade, and the appendix and bibliography give a number of effective aids.

The Covering of Open Service Reservoirs in Which Filtered or Ground Waters Are Stored.—By George C. Bunker, Engineer in charge of water purification, The Panama Canal; and August G. Nolte, Assistant Engineer. Reprinted from Journal of the New England Water Works Association, 1923. 30 pp. Illustrated. (Apply to George C. Bunker, Panama Canal, Ancon, C. Z.)

Public Utility Housing Societies.—Bulletin No. 2 of the International Garden Cities and Town Planning Federation, January, 1924. 28 pp. The constitutions, operations, methods of financing and management, achievements and prospects of public utility housing societies in Austria, Denmark, Finland, Germany, Great Britain, Holland, Italy, Latvia, Poland, Spain and Switzerland. (Apply to the Federation, 3, Gray's Inn Place, London, W. C. 1, England.)

Housing Problems in America.—National Housing Association, New York. 1924. 408 pp. $3.00.

Proceedings of the Ninth National Conference on Housing, held in Philadelphia December 5-7, 1923. The papers are grouped in part I under the general divisions of The Cost of Labor; The Cost of Materials; The Cost of Money; Philadelphia's Problems; Rent Control Laws; Zoning; Regional Planning. Part II is devoted to the discussions on the papers, by authorities in the fields represented.

Country Planning.—By Frank A. Waugh, Head of the Division of Horticulture and Professor of Landscape Gardening, Massachusetts Agricultural College. With an Introduction by Kenyon L. Butterfield, President, Massachusetts Agricultural College. Harcourt, Brace and Company, New York. 1924. IV + 183 pp. Illustrated. $1.25.

Country planning is not regional planning, but this volume emphasizes the natural interdependence of city and country. Country planning seeks to provide for the country the physical equipment which will best serve the social and economic needs of the people who live or visit there. This involves the improvement of transportation, public highways, school grounds, churches and cemeteries, playgrounds and picnic grounds, places of historic interest, housing and farm grounds, villages and towns, telephone, electric light, rural mail delivery, etc. Country planners must study political relations and deal with the problems of maintenance, and in order to get results, must be sure of local initiative, expert advice, time, and money.

New Jersey Commission Government Law (Walsh Act) and Municipal Manager Law.—By Lewis T. Stevens, Member of New Jersey Bar. Published by Albert R. Hand, Cape May, N. J. Fifth edition. 1924. $2.50.

The Walsh Act is given with all the amendments and supplements enacted up to the end of the 1923 Legislature, in order of topics. Under each topic appear all court decisions on the topic which have been rendered in the state up to January, 1924. The Municipal Manager Law was passed by the 1923 Legislature.

Mortgages on Homes.—Census Monographs II, published by the United States Bureau of the Census. 277 pages. Apply to the Government Printing Office, Washington, D. C. $1.25.

A report on the results of the inquiry as to the mortgage debt on homes other than farm homes at the Fourteenth Census. The inquiry was conducted by Charles S. Sloane, Geographer of the Census; the text was prepared by Thomas J. Fitzgerald, special agent, who also planned and directed the preparation of the statistical tables; and the manuscript was edited and revised under the supervision of Dr. Richard T. Ely, of the University of Wisconsin. The basic data include the value of the mortgaged homes, the amount of the mortgage debt, and the rate of interest, and are presented in various tabular classifications for geographic divisions and states and for cities having 25,000 inhabitants or more.

The Story of Detroit.—By George B. Catlin. The Detroit News, Detroit, Mich. 1923. XIX + 764 pp. Illustrated. $2.00 postpaid.

A simple outline history of Detroit's development since the time of Cadillac, written by the librarian of The Detroit News, in which paper it appeared serially in 1923. It has been republished in commemoration of the fiftieth anniversary of the founding of the News, with the idea of making the many thousands of new residents better acquainted with their home city and with the story of those who have struggled and triumphed in its development, and to inspire enthusiasm for the city and for good citizenship.

The Commonwealth Fund.—Fifth Annual Report, for the year 1922-1923. Published January, 1924. 75 pp. Covering the departments of Child Health, Prevention of Juvenile Delinquency, Foreign Operations, and Educational and Legal Research. (Apply to The Commonwealth Fund, 1 East 57th Street, New York, N. Y.)

Your City Needs
This Lawn Beautifier

You men have a responsibility in keeping municipal lawns and greens beautiful and healthy, and in seeing that they are maintained in the most economical way. Emphatically that is what you may expect of a Jacobsen 4-Acre Power Lawn Mower. It cuts fully four acres a day with one man and a gallon of gas—a saving of 50 to 75 percent in upkeep and more beautiful lawns because it does the work better and leaves no excuse for neglect.

The Jacobsen "4-Acre" Power Mower

Guaranteed to do more and better work at less cost and to outlast any other walking power mower. Standard automobile type differential makes easy steering about trees, flower beds and shrubbery. No other power mower will do as neat close-up work. It cuts on a 30 degree incline—does beautiful terrace work. The knives are sharpened by its own power without removing reel. It is simple, compact and sturdy. Anyone can handle it without being a mechanic. Pays for itself in a short time.

Jacobsen 4-Acre Power Lawn Mower

A Time-Tested Product

Years of unequaled performance on private estates, parks, cemeteries, golf courses, from coast to coast have proven the sterling quality of this mower. It wins everywhere in competition with all makes.

Our Special Power Putting-Green Mower is a favorite on Municipal Golf Links.

Write Today for Beautiful FREE BOOK

Pictures many beautiful lawns of satisfied users. Describes fully each type of mower.

The JACOBSEN MANUFACTURING CO. **Dept. E** **Racine, Wisconsin**

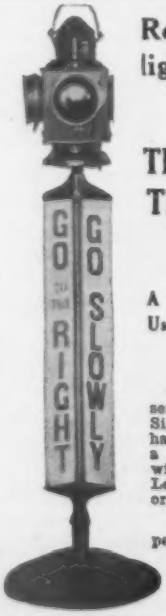
TAR KETTLES
SAND DRYERS
TOOL HEATERS

Portable Kettles 50 to 900 Gallons

Stationary 25 to 200 Gallons

Write for Catalog

THE JOS. HONHORST CO.
1016 W. 6th ST. CINCINNATI, O.



Requires filling and lighting once a week only

THE STAR SAFETY TRAFFIC POLICE LAMP

A Time and Labor Saver for Use on Silent Policeman Lamp and Flag Stands

This lamp uses a large Kerosene Oil Fount with Railway Signal Long Time Burner, and has to be filled and lighted once a week only. It is equipped with four 5-in. Ruby Optical Lenses, and used on movable or stationary stands.

This lamp can also be equipped to burn electricity.

Send for catalog.

STAR HEADLIGHT & LANTERN CO.
Rochester, N. Y.

The Detection and Prevention of Typhoid Epidemics.—By J. Frederick Jackson, Director, Bureau of Sanitary Engineering, Department of Health, Hartford, Conn. Reprinted from The Nation's Health, November, 1923. 3 quarto pp. Illustrated. A paper read before the joint meeting of water-works officials and Connecticut public health officials, Hartford, Conn., April 18, 1923. Reviewing important outbreaks of typhoid in Connecticut. (Apply to the Connecticut State Department of Health.)

Buffalo Parks and Public Buildings.—Locations, data, divisions and dimensions of the parks, parkways and minor places in Buffalo, N. Y., December, 1923. 16 pp. Handy size. Issued by the Bureau of Recreation. (Apply to John H. Mesh, Commissioner, Department of Parks and Public Buildings.)

The Modern Hospital Year Book.—Published annually by The Modern Hospital Publishing Company, Inc. Fourth edition, 1923. 604 pp. Illustrated. A reference book of equipment for hospitals and allied institutions, presenting a comprehensive index and classified directory of materials, equipment and supplies and the condensed catalogs and announcements of manufacturers and dealers serving the institution field. (Apply to the publishers, 22-24 East Ontario Street, Chicago, Ill. Limited number of copies available at $1.00.)

Basic Grading Rules and Working Stresses for Structural Timbers.—Recommendations of the Department of Agriculture. Prepared by J. A. Newlin, in Charge Section of Timber Mechanics, and R. A. Johnson, Engineer in Forest Products, Forest Products Laboratory, Forest Service. Department Circular 295. October, 1923. 23 pp. Giving the results of a half-million tests made by the Forest Products Laboratory to determine the physical and mechanical properties of wood. 5 cents. (Apply to the Superintendent of Documents, Government Printing Office, Washington, D. C.)

Taxation in Toronto.—Report of the Committee on Taxation of the City of Toronto re Single Tax. December 7, 1923. 53 pp. The single tax by-law was voted down on January 1, 1924, by a majority of 30,820. The findings and recommendations of the Committee are to the effect that the tax-exemption by-law, resulting at the end of ten years in taxation on the land only, is entirely opposed to the best interests of the city of Toronto. (Apply to J. C. Forman, Assessment Commissioner, Toronto, Ont.)

Shall New Jersey Tax Motor Fuel?—Published by the Good Roads Association of New Jersey, 164 Market Street, Newark, N. J., as the Trustees' report on the subject adopted by the Association, in opposition to gasoline tax as a super-tax. 28 quarto pp. Tables showing motor vehicle taxes in force in the United States, January 1, 1924. (Apply to the Association.)

America's Fifth City Tries P. R.—In Proportional Representation Review, January, 1924. An analysis of the recent election in Cleveland. 32 pp. Illustrated. (Apply to the Proportional Representation League, 1417 Locust Street, Philadelphia, Pa.)

Medical Inspection of Schools.—Bulletin No. 63 of the Russell Sage Foundation Library. February, 1924. 4 pp. 10 cents. A selected bibliography of material on this subject issued since 1914. (Apply to the Russell Sage Foundation Library, 130 East 22nd Street, New York, N. Y.)

Pageantry for Iowa Communities.—By George O. Hurley. Published by the State Historical Society of Iowa, Iowa City, Iowa. 1923. Bulletin of Information Series, No. 10, edited by Benjamin F. Shambaugh. 48 pp. A practical discussion of some of the problems involved in the writing, organization, and production of a community pageant. The material is drawn largely from the experience of the writer, who is a practical pageant master, and the bulletin also contains the results of a careful study of the literature on pageantry. 50 cents. (Apply to the publishers.)

Budget of the City of Cleveland.—In The City Record, official publication of the city of Cleveland, Ohio, for January 30, 1924. 68 quarto pp. (Apply to F. W. Thomas, Clerk of the Council.)

Chicago Traffic Regulations.—Complete Digest of Traffic Regulations Governing Motor Vehicles—state laws, ordinances of the city of Chicago, park ordinances, police parking rules. Pocket size. 32 pp. "Don't guess at the traffic laws—read them and know them." (Apply to Al. F. Gorman, City Clerk.)

Oklahoma Municipalities.—Proceedings of the Tenth Annual Convention of the Oklahoma Municipal League. University of Oklahoma Bulletin, February 15, 1924. 74 pp. Containing papers on the following subjects: The Assessment of Abutting Property for Construction of Sidewalks; The Oiling of Earth Roads and Streets; How Cities Can Lessen Their Fire Insurance Rates; The Handling of Municipal Water-Works; Standard Accounting for Oklahoma Cities; Public Utility Regulation in Home Rule Cities in Oklahoma; Rules, Regulations, and Orders of the Oklahoma Corporation Commission as They Affect Cities and Towns; Municipal Swimming Pools; Municipal Ownership versus Private Ownership of Electric Light Plants in Oklahoma; Zoning for Oklahoma Cities. (Apply to The University of Oklahoma, Norman, Okla.)

Financial Statistics of Cities of 30,000 Population and Over, 1922.—Preliminary statement of 261 cities as to assessed valuation of property subject to general property taxes, total revenues, governmental-cost payments, and net debt. 15 pp. (Apply to the United States Bureau of the Census, Washington, D. C.)

Bridging the Hudson at New York City.—Bibliography prepared by the Municipal Reference Library, 512 Municipal Building, New York, N. Y. Fully annotated, and divided into three parts: (1) General Material; (2) Lindenthal Project; (3) New York and New Jersey Bridge Project. 20 pp. 25 cents. (Apply to the Library.)

Ottawa Suburban Roads Commission.—Annual Report of the Engineer for the Year 1923. Also Unit Costs of Work Completed. 22 quarto mimeographed pp. Illustrated with photographic prints. (Apply to Alan K. Hay, Engineer of the Commission, Ottawa, Ont.)

The Town Hall Crier.—No. 1, March 11, 1924. 2 quarto pp. Announcement of the principles, functions and activities of the Town Hall, New York City. Apply to Robert Erskine Ely, Director, The Town Hall, 123 West 43rd Street, New York, N. Y.)

Outdoor Swimming Pools.—By Stanley Pinel. Bulletin 61 of the Engineering Extension Department, Iowa State College, Ames, Iowa. January 23, 1924. 31 pp. Illustrated. Covering principles of design, construction and sanitation, and suggesting approved methods. (Apply to the Department.)

Studies in Citizenship for Women.—A program for women's clubs. Revised edition of University of North Carolina Extension Bulletin, Vol. III, No. 5, November 1, 1923. 43 pp. By D. D. Carroll, M.A., Professor of Economics and Dean of the School of Commerce of the University. Issued by the Bureau of Public Discussion in response to a request from the Civics Department of the North Carolina Federation of Women's Clubs. Simple outlines for study and discussion, covering national, state and local government, and popular control. 50 cents. (Apply to Women's Club Section, Bureau of Public Discussion, University Extension Division, Chapel Hill, N. C.)

School Records and Reports.—A Score Card and Standards for the Records and Reports of City School Systems. By George D. Strayer, Professor of Education, and N. L. Englehardt, Professor of Education, Teachers College, Columbia University, New York, N. Y. Published by Bureau of Publications, Teachers College. 1923. 86 pp. Preliminary edition. A method of checking the records and reports of a school system in order to secure greater uniformity among schools in the collection of data on educational programs or policies. The score card and standards presented are designed for use by the superintendent and the staff in the school systems of cities of 100,000 population and less, and for the use of survey groups in the analysis of records in such school systems. $1.00. (Apply to C. J. Tidwell, Director, Bureau of Publications.)

The Detroit Metropolitan Area.—A report prepared for the Metropolitan Committee of the Detroit Board of Commerce by the Detroit Bureau of Governmental Research, Inc. January, 1924. 25 mimeographed quarto pp. Maps. A discussion of the feasibility of creating a metropolitan district or districts to include Detroit and neighboring cities and villages, for the purpose of undertaking certain projects that cannot be undertaken satisfactorily by the cities and villages individually. (Apply to the Bureau, 316 East Jefferson Avenue, Detroit, Mich.)

An investment—*not a speculation*

The long life and low cost of Trinidad Lake Asphalt pavements have been ***proved*** through nearly a half century of service on modern streets and highways.

Millions of square yards of Trinidad paving—in all parts of the world and from 10 to 40 years old—have cost less than 2 cents per square yard per year for maintenance.

Trinidad Lake Asphalt is a native bitumen—storm-beaten and weather-seasoned for centuries. It resists heat, cold, water and wear to a greater degree than any other bituminous paving material known.

Write at once for booklets describing this remarkable nature-made paving material.

THE BARBER ASPHALT COMPANY

PHILADELPHIA

New York, Chicago, Pittsburgh, St. Louis, Kansas City, San Francisco

Michigan Avenue, Chicago (Boulevard Link) paved with Trinidad Lake Asphalt in 1922.

TRINIDAD LAKE ASPHALT

Directory of Public Improvements in the Cities of Kansas, 1923.—Bulletin No. 44, December 14, 1923. Compiled and mimeographed by the Municipal Reference Bureau, University Extension Division, University of Kansas, Lawrence, Kans. 28 pp. Based on data from approximately 542 incorporated cities. (Apply to the Bureau.)

Drainage and Sewerage, Chicago.—"Memorandum Concerning the Drainage and Sewerage Conditions in Chicago and the Diversion of 10,000 C. F. S. from Lake Michigan at Chicago." Issued by the Board of Trustees of the Sanitary District of Chicago. December, 1923. 92 pp. Map, tables. Describing the drainage and sanitary conditions in Chicago and vicinity and demonstrating the need of the diversion mentioned. The Appendix includes the historical facts regarding negotiations and work in connection with this proposed undertaking. (Apply to William J. Healy, President, The Sanitary District of Chicago, Chicago, Ill.)

The State Park Plan for New York.—Published by the Committee on State Park Plan, New York State Association, January, 1924. Second edition. Revised to show progress to date, with the proposal for the new park bond issue. 96 pp. Views, maps. (Apply to Robert Moses, Secretary, Committee on State Park Plan, 305 Broadway, New York, N. Y.)

Waterways—A Part of the Pittsburgh Plan.—Report No. 6 of the Citizens Committee on City Plan of Pittsburgh. October, 1923. 60 quarto pp. Views, maps, charts, drawings, tables. A study of the problem of water transportation, with recommendations for development; including a specific study of wharf improvement and a section on flood protection. 50 cents. (Apply to George Ketchum, Executive Secretary, Citizens Committee on City Plan of Pittsburgh, Pittsburgh, Pa.)

The Chemical Industry in New York and Its Environs.—Present Trends and Probable Future Developments. By Mabel Newcomer, Ph. D., Associate Professor of Economics, Vassar College. 50 quarto pp. Maps, diagrams, tables. The first in a series of economic and industrial surveys prepared to show for each of the twelve principal economic activities of the Metropolitan Region the existing location and importance of the activity; growth and movement during the last 25 years; and probable future demands of the industry upon location, space and workers. (Apply to Plan of New York and Its Environs, 130 East 22nd Street, New York, N. Y.)

Sewerage and Sewage Disposal in Massachusetts.—Special Report of the Massachusetts Department of Public Health Relative to an Investigation of Sewerage and Sewage Disposal for the Cities of Salem, Beverly and Peabody and the Town of Danvers and for Certain Public Institutions. January, 1924. 31 pp. Large map. House Document No. 1300. Showing the mutual advantage of the construction of joint disposal works and their operation under a joint board. (Apply to X. H. Goodnough, Chief Engineer, Department of Public Health, 141 State House, Boston, Mass.)

Westchester County Water-Supply.—Report on the Water-Supply of Westchester County, New York, to the Board of Supervisors of the County, by Nicholas S. Hill, Jr., consulting engineer. November 14, 1923. 48 pp. Maps. Covering present and probable future needs and the way to meet them. (Apply to the author at 112 East 19th Street, New York, N. Y.

Pasadena, Calif.—Annual Report of the Controller of Accounts for the year ended June 30, 1923. (Apply to Geo. H. Wood, Controller of Accounts.)

St. Louis, Mo.—Annual Report of the Board of Commissioners of Tower Grove Park for 1923. (Apply to James Gurney, Jr., Park Superintendent.)

San Jose, Calif.—Annual Report of the Health Department for 1923. (Apply to H. C. Brown, M. D., Health Officer.)

Toronto, Ont.—Annual Report of the Assessment Commissioner for 1923. (Apply to James C. Forman, Assessment Commissioner.)

District of West Vancouver, B. C.—Financial Statement for 1923. (Apply to S. Gisby, Chairman Finance and Light Committee.)

On the Calendar of Conventions

APRIL 9.—WASHINGTON, D. C.
American Civic Association. Second annual conference on the Federal City. Secretary, Miss Harlean James, Union Trust Building, Washington, D. C.

APRIL 15-17.—ATLANTA, GA.
Southeastern Water and Light Association. Annual convention. W. F. Stieglitz, Columbia, S. C.

APRIL 25-26.—JEFFERSON CITY, MO.
Missouri Commercial Secretaries Association. Annual meeting. M. V. Carroll, Chamber of Commerce, Springfield, Mo.

MAY 5-8.—CLEVELAND, OHIO.
Chamber of Commerce of the United States of America. Annual meeting. D. A. Skinner, Mills Building, Washington, D. C.

MAY 7-8.—PARIS, TEX.
League of Texas Municipalities. Annual convention. Executive Secretary, Frank M. Stewart, Government Research Division, Bureau of Extension, University of Texas, Austin, Tex.

MAY 13-15.—ATLANTIC CITY, N. J.
National Fire Protection Association. Annual meeting. Secretary, Franklin H. Wentworth, 40 Central Street, Boston, Mass.

MAY 19-23.—ATLANTIC CITY, N. J.
National Electric Light Association. Annual meeting. Executive Manager, M. H. Aylesworth, 29 West 39th Street, New York, N. Y.

MAY 19-24.—NEW YORK, N. Y.
American Water Works Association. Annual convention. Address: W. M. Niesley, 153 West 71st Street, New York, New York.

MAY 22-24.—MIDDLETOWN, OHIO
Ohio Commercial Secretaries Association. Annual meeting. Secretary, Avery G. Clinger, Chamber of Commerce, Columbus, Ohio.

MAY 26-29.—WASHINGTON, D. C.
Annual Conference on Weights and Measures. Secretary, H. E. Holbrook, Bureau of Standards, Department of Commerce, Washington, D. C.

JUNE 3-5.—ROCHESTER, N. Y.
Conference of Mayors and Other City Officials of the State of New York. Annual convention. Secretary, William P. Capes, 25 Washington Avenue, Albany, N. Y.

JUNE 5-7.—MINERAL WELLS, TEX.
Texas Commercial Executives' Association. Annual Convention-School. Secretary, O. C. B. Nair, Corsicana.

JUNE 11-13—SPARTANBURG, S. C.
Southern Commercial Secretaries' Association. Annual Convention-School. Secretary-Treasurer, L. P. Dickie, Tampa, Fla.

JUNE 16-20.—DETROIT, MICH.
National Organization for Public Health Nursing. Biennial convention. General Director, Anne A. Stevens, 370 Seventh Avenue, New York, N. Y.

JUNE 19-20.—DETROIT, MINN.
League of Minnesota Municipalities. Annual convention. Executive Secretary, Morris B. Lambie, Municipal Preference Bureau, University of Minnesota, Minneapolis.

JUNE 24-26.—BOSTON, MASS.
New England Association of Fire Chiefs. Annual convention. Secretary, Chief John W. O'Hearn, Watertown, Mass.

JULY 2-9.—AMSTERDAM, HOLLAND
International Town Planning Conference. Address: Organizing Secretary, International Garden Cities and Town Planning Federation, 3, Gray's Inn Place, London, W. C. 1, England.

JULY 20-26.—PALO ALTO, CALIF.
Western Summer School of Community Leadership. Address: Professor Edwin A. Cottrell, Stanford University, Calif.

JULY 20-AUGUST 2.—EVANSTON, ILL.
National School for Commercial and Trade Executives. Address: Robert B. Beach, Business Manager, Chicago Association of Commerce, Chicago, Ill.

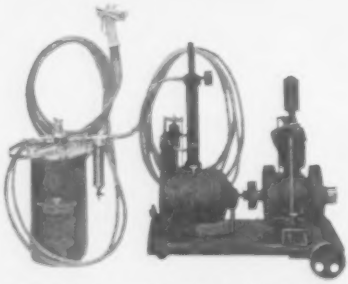
SEPTEMBER 23-26.—ROCHESTER, N. Y.
New England Water Works Association. Annual convention. Secretary, Frank J. Gifford, 715 Tremont Temple, Boston, Mass.

OCTOBER 20-22.—WASHINGTON, D. C.
National Association of Commercial Organization Secretaries. Annual convention. Secretary-Treasurer, Raymond B. Gibbs, Kansas City, Kans.

1924—BUFFALO, N. Y.
International Association of Fire Engineers. Annual convention. Secretary, James J. Mulcahey, Yonkers, N. Y. Date to be determined at Directors' meeting in Buffalo, April 15.

Meet your Maintenance Budget the "SPRACO" Way!

SPRACO VOLUME TYPE EQUIPMENT. The fastest painting service in existence. Decimate your labor costs on bridges, buildings, and other large areas.



SPRACO EXTRALITE EQUIPMENT (Total weight 135 lbs.) carried on a small motor truck for painting Police and Fire Department Boxes, Hydrants, Letter Boxes, Park Benches, etc., at a fraction of the cost of hand brushing. Also used for repainting trucks, wagons and other city equipment.

Make Your City Safe!

SPRACO TRAFFIC MARKER. In use throughout the country by City Street Departments and State Highway Departments for marking Safety Zones, Traffic Zones, etc. The same equipment (detached from marker) is used for painting guard rails, road beacons, bridges, buildings, etc.

Write Department P. G. 72 stating your requirements.

SPRAY PAINTING AND FINISHING EQUIPMENT SALES CO.

Distributors for the

SPRAY ENGINEERING COMPANY

60 High Street — Boston, Mass.

TRADE MARK

SPRACO

BOSTON

News and Illustrations

Items of Interest to City, Town and County Officials, and Others Interested in the Economical Construction and Efficient Operation of Public Improvement Undertakings

Street and Highway Protection Automatically and Economically Performed

By H. E. Gifford

Signal Equipment Engineer, The Adams & Westlake Company, Chicago

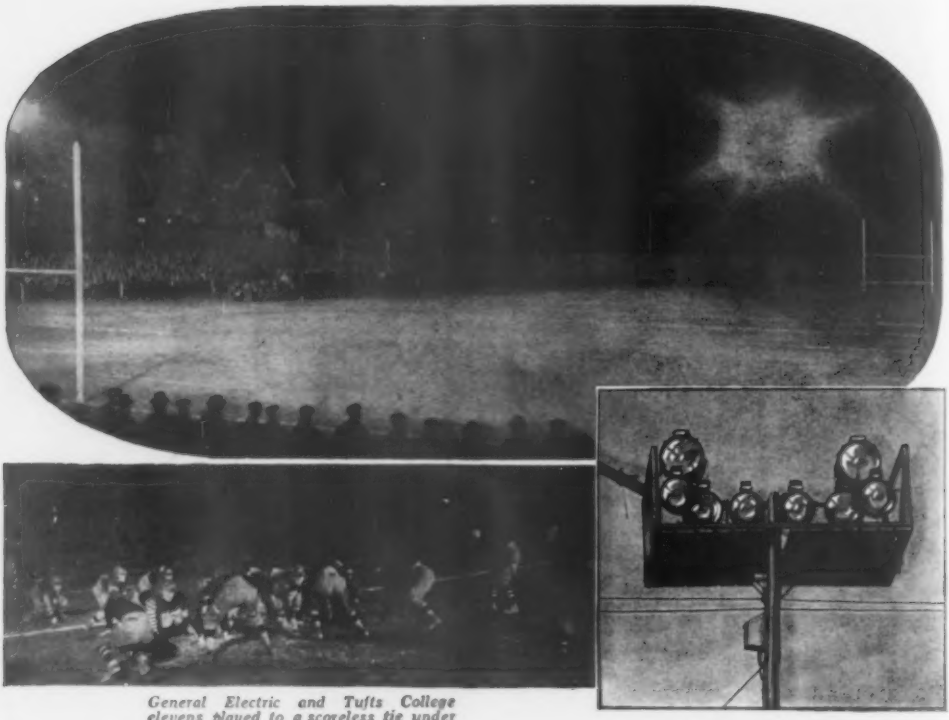
WHEN the city of Chicago found its protected boulevards inadequate to take care of the rapidly increasing motor traffic, the municipality provided for a system of "through" or protected streets. Users of these through streets are supposed to enjoy the same protection from cross-traffic that is given on regularly recognized boulevards. At first the only designation of these streets was a sign placed on the right of each cross or intersecting street bearing the wording, "Through Street —Stop." During the daytime these signs functioned fairly well, but after dark they were generally worthless, as no lighting of any kind was provided. A check-up of violations throughout the city showed that after dark very few motorists were aware of the approach to these streets, there being nothing to designate them.

In enforcing the through street ordinances, to prevent serious accidents, it was essential that some efficient method of through street designation be found. It was the desire of those who had the matter in mind to find a signal which combined economy of installation with economy of maintenance, and in addition genuine dependability. The cost of installation was important, inasmuch as a complete installation of signals at every corner where a general street crossed or intersected a through street, would require many hundreds, even thousands, of units. The maintenance item was equally important for the same reason.

It was decided at the outset that the most efficient light signal is of the flashing type. It has the advantage of attracting attention where a stationary light might be unnoticed, especially in a street where there were many other lights. The flasher type of light has long been in use by the U. S. Lighthouse Department and for marking river and harbor channels, also in isolated locations where signals must function for long periods without attention.

The unit selected is nothing more or less than a light standard to be placed on the right of the intersecting or cross-street, 20 to 30 feet back from the through street, plainly visible to the approaching motorist. This standard, the base of which contains a compartment for holding four Edison Primary batteries and flasher relay, is set in the ground so that the top of the compartment is about 6 inches above the

AN ELECTRIC FLASHING SIGNAL FOR CROSS-STREETS



General Electric and Tufts College elevens played to a scoreless tie under G-E floodlights at Lynn, Mass. A crowd of 5000 witnessed the game.

Recreation by Night as Well as by Day

Football at night has become a practical accomplishment, opening up a vast range of possibilities for recreation well worth the attention of any community.

Hockey by artificial light is common and some cities illuminate their skating parks by means of floodlights. Bathing beaches have also been floodlighted and lighted playgrounds are not unusual.

The broadening of the field for illumination results in increasing the opportunities for night-time enjoyment, thus offering recreation to many city-dwellers who have no other time to secure such pleasures.

Detailed information on the use of floodlighting for purposes of decoration, protection or recreation will gladly be furnished by any G-E office.

As in other fields of illumination, the General Electric Company has devoted considerable research to the problems of the application of floodlighting. G-E floodlighting projectors are adapted to a vast field of usefulness.

General Electric Company
Schenectady, N. Y.
Sales Offices in all Large Cities

35C-131

GENERAL ELECTRIC

When writing to Advertisers please mention THE AMERICAN CITY—Thank you.

surface of the ground. Connections are made between batteries, relay and bulb, and the device is ready for service.

There are no wires to bring in from the outside, no digging up of streets to lay conduits, no transformer expense or similar outlay. Every working part of the device is contained within the unit. The signal is in no way dependent on an outside source of power. Every power-plant in town might be closed down and this signal would go right on working as though nothing unusual had happened. A safety signal of this kind is never so necessary as when street lights have failed. All that has to be done to move the signal is to decide upon the new location, sink the standard into position, and fill up the old excavation. There is no wiring to bother with, no necessity of laying new conduits, nor is any engineering skill required.

Through the use of a specially designed reflector and lens the rays from the one-candle-power bulb are amplified several hundred times, so that the signal is readily picked up several blocks away. A simple, effective flasher using less than 1 per cent of the energy required to light the lamp filament, gives a brilliant, snappy flash-light effect that commands attention. A real factor in making this device popular is its very small cost for operation. The current for operating the flasher and lighting is supplied by a number of economical Edison Primary batteries. Under ordinary circumstances these cells will operate the unit for a year and a half to two years without attention of any kind.

One of the outstanding advantages of a signal system using these units is its elasticity. Regardless of whether the requirements in a community call for ten or a thousand units, they may be installed as needed, and as each is put into service it starts right to work without waiting for the completion of the system as a whole.

Badger Water-Meters for Porto Rico

The Badger Meter Manufacturing Company, Milwaukee, Wis., was recently awarded the contract for furnishing the city of San Juan, Porto Rico, with water-meters. The first part of this order calls for 5,000 meters.

Loading Snow with a Standard Truck Loader

Following the storm of February 20 and 21, 1924, New York City officials contracted with C. J. Mallett, Inc., Bronx, New York City, for the removal of some of the snow which had been piled along the curb. Some of the piles were 10 feet wide and 15 feet high. To load this snow into motor trucks, he used a gasoline-driven standard Model 24 Haiss creeper loader. When the trucks were loaded, they ran to the docks and dumped the load.

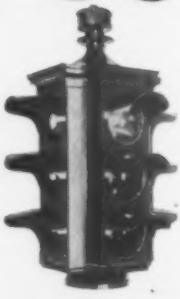
By the use of this loader it was possible to handle 6½ to 7 yards of snow in three to four minutes with one operator, and two shovelers cleaning up outside of the feeding propellers. Mr. Mallett stated that the loader saved at least 25 men and got his trucks away faster. The machine used was the standard outfit for handling stone, sand and gravel, but it worked admirably for snow handling with profitable results.

LOADING SNOW WITH MECHANICAL LOADER INTO A 5-TON WHITE TRUCK EQUIPPED WITH A SHADBOLT BODY, AFTER NEW YORK'S ONE BIG SNOW-STORM OF THE WINTER

SAFETY *with* STOP! and GO *for City Streets*

The feeble, erring human hand and mind are no longer trusted to guide the crack flyer on its speeding journey—automatic, infallible machine signals have replaced the old switchman. These perfect controls now flash their message to the engineer.

Just so with street traffic. Most progressive cities are relieving the traffic officer from his monotonous post and allowing him to supervise the traffic from a point of vantage on the curb line.



HAND AND TRUCK METHODS OF DISTRIBUTING CALCIUM CHLORIDE FOR CURING CONCRETE ROADS AND DUST-LAYING RESPECTIVELY

Spreading Calcium Chloride on Roads

The application of calcium chloride to roads as a dust palliative is increasing yearly. This material is also used for curing concrete roads with great effectiveness. The Dow Chemical Company, Midland, Mich., has developed a spreading device, made primarily for distributing Dowflake, the product of the Dow Chemical Company, which can be used effectively for both kinds of work.

The spreader for application to roads to keep down dust is particularly simple and can be easily attached to any truck. It consists of a V-shaped hopper with an adjustable slot at the bottom, which is attached to the rear of the truck and into which one man can pour the calcium chloride flakes with sufficient rapidity to keep the flow constant. The other spreader is a similar, although smaller, device which can be carried on an ordinary wide-wheeled baggage truck and is used to apply the calcium chloride to concrete roads as soon as it is possible to run on concrete after it has obtained its initial set. The one-man hopper holds from 100 to 200 pounds of Dowflake, and one man with the machine can spread in an hour a sufficient amount of calcium chloride to cover the concrete that the mixer can lay in a day.

A New Meter Service Switch with Safety Locking Device

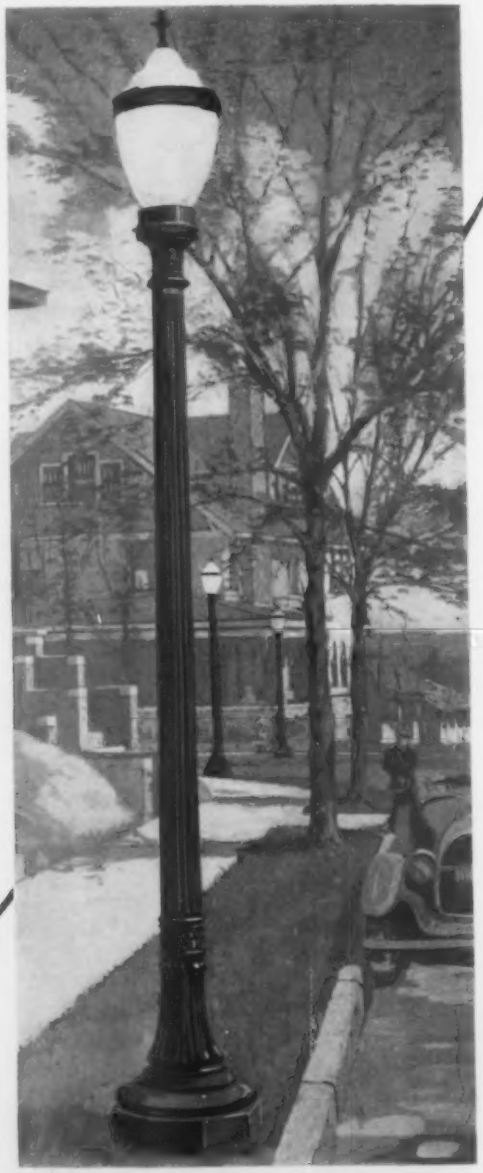
A new meter service switch with a safety locking feature has been designed by the Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa., for use in connection with meters placed by central stations in the plants or houses of their customers. The switch is so constructed that theft of current or tampering with the meter switch is impossible. The main cover is hinged at the lower end of the switch cabinet and is equipped with a sealing slot in the upper right-hand side for wire or strap seals to protect the meter. The face of the cover contains a horizontal sliding steel shutter, through which the service switches are accessible to the user. This steel shutter is controlled by an interlocking device on the externally operated service-control handle which makes it possible to open the fuse compartment only when the control handle is in the "off" position, and prevents closing the switch when the fuse enclosure is open. The device is so connected that the main switch is ahead of the main fuses, assuring the user positive protection while replacing fuses.

Two brackets on the outside of the switch cover provide for locking the service-control handle in either the "on" or the "off" position. An outside ground lug in the upper corner provides for the grounding of the switch-box. Through the use of U-shaped slides in the lower right-hand side of the compartment, these switches may be banked for apartment-house

A TRULY SAFE SWITCH

Illustration is from an oil painting of King Standard as installed at Kansas City, Kansas.

Richly designed, built substantially—King Ornamental Lighting Standards equipped with General Electric Novalux lighting units—provide a beautiful, economical, efficient system of illumination.



KING MANUFACTURING CO
ORNAMENTAL LIGHTING STANDARDS
230 South Clark St. Chicago USA

DUMP BODY WITH TAIL-GATE SWINGING OPEN AS LOAD IS DUMPED

installations. Three of the six styles of this meter are arranged with corrugated test clips and test blades, permitting the test of meters without the interruption of the user's service.

A Quick-Acting Self-Dumping Body for Light Trucks

Having built steel dump bodies for heavy trucks for quite a number of years, the Research and Engineering Department of the Stewart Iron Works Company, Cincinnati, Ohio, has developed a new automatic or gravity-dump body for Ford one-ton trucks. The body is constructed of steel, has one-cubic-yard capacity, and is dumped by a control lever from the driver's seat. This same lever returns the body to place. The driver does not have to leave the seat to dump the body or to return it to place. The tail-gate opens automatically when the body is dumped, and closes automatically as the body is returned. The body is also furnished with mud-guards to protect the cab and body from splashing. The loading edge of the body when mounted on a Ford chassis is 47 inches from the ground with the body loaded, making it probably the lowest body on the market to-day.

The tail-gate is double-acting, permitting the body to be used for any purpose, making it suitable for road building, general municipal service, contracting and other work. The dumping angle for the steel body, made of one piece of No. 10 gage sheet steel, is 45 degrees.

DUMP BODY IN FULL DUMPING POSITION WITH TAIL-GATE EXTENDED

A Convenient Rubbish Basket

Many of the complaints regarding paper dropped on the street or in parks or about school yards could be done away with if cities would provide plenty of trash cans to receive old newspapers, paper bags and similar material. The average citizen does not want to carry an old newspaper around with him, and is very liable to drop it in the gutter unless he sees a trash can ready to receive it.

The Cyclone Fence Company, Waukegan, Ill., is making a catch-all basket which is particularly adapted to parks and schools. The basket is well built of heavy crimped wire, electrically welded, with a bottom of heavy sheet steel, ribbed and perforated. A cover is furnished, chained to the basket, so that all that is necessary is to set the basket out in an open space, touch a match to it and the rubbish is completely consumed. A carrier is made to fit the catch-all basket, which is convenient when the basket must be carried a considerable distance for emptying or burning the contents. The carrier is built with two handles, and the basket itself is 29 inches high.

A WIRE RUBBISH BASKET IN USE AT AN AUTO TOURIST PARK

There is no motor truck built that will give more years of service at less cost than the Federal. That is why so many municipalities are using Federals in great numbers with complete satisfaction.

Spring cleaning time in cities and towns requires up-to-date motor truck equipment. Federal Flushers like the one here owned by Provo City, Utah, are helping to clean up hundreds of cities all over the country. Write for complete specifications of this combination flusher and sprinkler on Federal chassis.

Write for Booklet S.10 "Making One Thing Better."

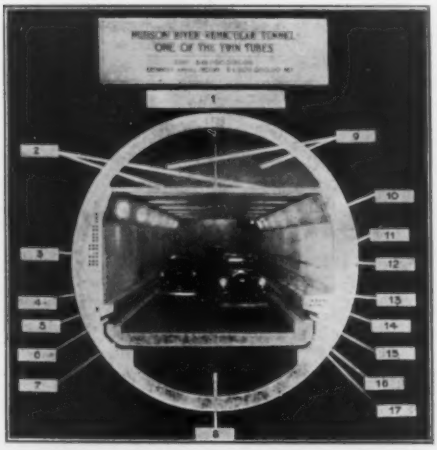
FEDERAL MOTOR TRUCK COMPANY

Detroit, Michigan

Illuminating the New York-New Jersey Vehicular Tunnel

The general features of the construction of the New York-New Jersey vehicular tunnel are quite well known to the general public. The tunnel will consist of two tubes, one for eastbound and one for westbound traffic. Each will be 29 feet 6 inches in diameter and 9,250 feet long. The roadways will be 20 feet wide and have overhead clearance of 13 feet 6 inches. The rest of the space within the tubes will be required for the ventilation system, which consists of air ducts at the top and bottom of each tube. Fresh air under compression will be forced into the lower duct and from there into the roadway itself through air flues and expansion chambers placed at intervals of 15 feet along each side of the tunnel. This will force the vitiated air out through openings, also at 15 feet intervals, into the top ducts, whence it will be drawn out by large fans and discharged through the caissons at the ends of the tunnels.

The tunnels are now being constructed from both ends and will meet somewhere under the river. The tunnels are built in ring sections of 14 cast-iron plates each, each plate weighing a ton and a half. The excavating is done in shields or cylinder heads, which are pushed forward 2½ feet at a time by 30 hydraulic jacks. As the shields move forward, the rings are added one by one. When completed, the tunnels will have a protective covering of broken stone and at each entrance there will be a modern pier above the tunnel as it reaches the land, to avoid the possibility of a ship's running into the tunnel where it comes up.



A MODEL OF THE HUDSON RIVER VEHICULAR TUNNEL, SHOWING THE TENTATIVE LIGHTING SYSTEM

The numbers on the face of the model indicate the following points: 1. The ventilation of the tunnel is carried on transversely with no longitudinal movement of the air. Air is completely changed 42 times an hour. 2. Exhaust port for ventilation every 15 feet throughout the length of the tunnel. 3. Telephone and telegraph cable ducts which will produce an annual income of $100,000. 4. Fire extinguisher. 5. Water-supply pipe. 6. Continuous fresh air supplied to roadway. 7. Fresh-air flues every 15 feet. 8. Fresh-air duct running the entire length of the tunnel. 9. Exhaust-air duct running the entire length of the tunnel. 10. Tunnel segment weighing 3,000 pounds. 11. Weight of complete segment ring, 21.6 tons. 12. Concrete liner for tunnel. 13. Sidewalk. 14. Power cables for operation of tunnel. 15. Fresh-air expansion chamber. 16. Fresh-air flues every 15 feet. 17. Drain.

One of the most difficult problems with regard to the prospective use of the tunnel for vehicular traffic has been the question of proper illumination. The engineers of the New York-New Jersey Bridge and Tunnel Commission, Clifford M. Holland, Chief Engineer, have given this problem careful study and developed a system which has been worked out by the Illuminating Engineering Laboratory of the Westinghouse Lamp Company. In order to study all suitable systems of illumination under approximate operating conditions, an exact model of the tunnel on a scale of 1 inch to 1 foot and 10 feet long was constructed at the Westinghouse Lamp Company's plant at Bloomfield, N. J. Exact replicas of the recommended lighting units were installed in this model tunnel, furnishing an amount of light corresponding accurately to the desired illumination. The model tunnel pictured above is complete in every detail, even to the brass railing along the walk for pedestrians.

The proposed lighting unit itself consists essentially of a cast iron box containing a cast iron enameled reflector, a 100-watt lamp provided with suitable mounting, and a hinged cover, furnished with a diffusing glass. The face of the cast iron outer box is provided with a simple ring bolted on, which in turn carries the hinges supporting the cast bronze door. The units are set flush with the wall, placed opposite on 20-foot centers, and are tilted downward at the angle of the tunnel wall, approximately 20 degrees. Servicing is from both sides of the river to alternate units. The engineers of the Tunnel Commission have very elaborate plans providing for the isolation of each small group of units so that maintenance may be as easy as possible.

The combination of flush-type units and diffusing cover, together with the close spacing, gives a remarkably uniform illumination of an average intensity of two-foot candles. The fact that the ceiling is lighted and free from sharp shadows obviates a so-called "tunnel" appearance and many resulting bad psychological effects. This is important, not only for comfort in driving, but also for giving the tube a pleasing appearance.

Pearse, Greeley & Hansen Move Office

Pearse, Greeley & Hansen, hydraulic and sanitary engineers, Chicago, Ill., have announced that they will remove their offices on April 15, 1924, from 39 West Adams Street, to the Tower Building, 6 North Michigan Avenue, at the corner of Madison Street, the Loop District. This organization will continue to be available for engagements for consulting work in connection with sanitary works.

Are You Being Handcuffed By Figures Like These ?

Gasoline—Tires—Oil—Repairs—How Quickly Expenses Like These Mount Up and Cut into the Police Appropriation and Yet They Can Be So Easily Reduced to a Minimum. Read the Following Reports and You Will See How Police Chiefs Everywhere Are Reducing Departmental Expenses With the New Indian Scout.

CHIEF WILLIAM J. QUILTY, of Springfield, Mass., reports that three automobiles ran a total of 48,715 miles on 3,958 gallons of gasoline and 146 gallons of oil. At the same time he operated seven Indian Scouts which covered a distance of 50,193 miles on 1,383 gallons of gasoline and 79 gallons of oil.

For the sake of comparison, compare the operating expense of 7 automobiles with that of 7 Indians and you will readily see how much money you can save—

7 Automobiles

9233 Gal. Gasoline	at $ .20	$1,846.60
146 Gal. Oil	at 1.00	146.00
		$ 1,992.60

7 INDIAN MOTORCYCLES

1383 Gal. Gasoline	at $ .20	$ 276.60
79 Gal. Oil	at 1.00	79.00
		$ 355.60

No matter what the size of the town, the police motorcycle is an excellent investment. Macon, Ga., police department using 10 motorcycles policemen averages $15,666 yearly in fines collected for speeding and traffic violations. New York City motorcycle police made a clear net profit of $481,662 in 9 months—using Indian Motorcycles.

Consider the great expense of an automobile; consider the advantage of the average auto in catching speeders, thieves and criminals in high-powered motor cars and you will see the advantage of using Indian Motorcycles in your department.

INDIAN SCOUT

—the Ideal Police Motorcycle!

100 pounds lighter than ordinary motorcycles, yet powerful enough to overtake high powered motor cars. Left-hand throttle control leaves right hand free for action. Low saddle position and perfect balance makes Indian Scout easily manoeuvred through densest traffic—the ideal motorcycle for patrol duty, escort work and catching speeders. Thousands are now in use by police throughout the country.

The Indian Motocycle Company are more than just manufacturers of motorcycles. They are specialists in police requirements and will gladly analyze your needs and make recommendations. No obligation. Write for new booklet "Maintaining Law and Order." Address Dept. A4.

Indian Motocycle Company

Dept. A-4 Springfield, Massachusetts

Diven, Jr., with Kelly Concrete Well Company

Jack M. Diven, Jr., well known to the waterworks fraternity, is now representing the Kelly Concrete Well Company of Grand Island, Nebr., in the New York District. His address is 235 West 71st Street, New York City.

Good Roads Machinery Company Establishes Chicago Warehouse

In order to give better service to customers, the Good Roads Machinery Company, Inc., Kennett Square, Pa., has established a warehouse in Chicago at 49th and Halsted Streets, where it will carry a complete stock of road-building machinery and parts, making possible quick shipments of repair parts for emergency cases. The local offices of the company will be established at the warehouse.

New Fire-Alarm System for Gastonia, N. C.

A contract for a six-circuit fire-alarm system was awarded to the Gamewell Company, Newton Upper Falls, Mass., on February 26, by the City Council of Gastonia, N. C. Sixty porcelain steel Peerless boxes, each with a quick-action door, are to be installed on the streets. A storage battery switchboard and a repeater together with generator and necessary battery are to be installed at fire headquarters. Provisions have been made to care for the growth of the city, as 150 boxes may be installed without increasing the central station equipment.

Recent Orders for Fire Apparatus

Among the recent orders for Childs-equipped fire apparatus, the Motor Fire Equipment Department of the Foamite-Childs Corporation, Utica, N. Y., reports the following: triple combinations for Fox River Grove, Ill., Sharon, Pa., Hanover, N. H., Bridgton, Me., Laurinburg, N. C., Van Alstyne, Tex., Manor, Pa., Hastings, Pa., Pascoag, R. I., Margaretville, N. Y., Andes, N. Y., Mt. Carroll, Ill., and Amenia, N. Y.; single-tank combinations for Athens, Tex., Manhasset, L. I., and Granville, N. Y. Orders for two-tank chemical equipment have been received from Mount Lake Park, Md., for a pump and hose car for Barrington, N. J., and for a straight hose car for Bedford Hills, N. Y.

Portland Cement Association Staff Changes

C. D. Franks, who since June, 1916, has been District Engineer in charge of the Association's Indianapolis office, is appointed Assistant General Manager in administrative charge of Association work in the districts covered by the Minneapolis, Milwaukee, Des Moines, Chicago, St. Louis, and Indianapolis offices. Until June 1, 1924, Mr. Franks' headquarters will be the Merchants Bank Building, Indianapolis. After that date his headquarters will be 111 West Washington Street, Chicago.

L. C. Miller succeeds Mr. Franks as District Engineer in charge of the Indianapolis office. Since February, 1917, Mr. Miller has been Association Field Engineer in Indiana, and during his work in that capacity he has acquired a large acquaintanceship in the district of which he now takes charge. The Indianapolis office of the Association, located in the Merchants Bank Building, is in charge of the Association work in Indiana and Kentucky.

A new Association office is open in Charlotte, N. C. John E. Tate, heretofore District Engineer in charge of the New Orleans office and previously Association Field Engineer in North Carolina, is appointed District Engineer in charge. Until July 1 this office will be located in the Piedmont Building. After that date the permanent address will be the Johnston Building. The Charlotte office will be in charge of Association work in North Carolina.

State Law Makes Better Fire Protection Possible

In 1923 California passed a law empowering any unincorporated settlement or district to determine by popular vote whether or not it should be formed into a fire district. At the same time the voters are required to authorize the necessary tax levy to purchase, house and maintain the fire apparatus. The tax rate for this purpose has, of course, varied widely, in some cases running as low as 10 cents per $100, while in others the assessment has reached 50 cents per $100. This is, of course, directly controlled by the taxpayers themselves, and is an accurate measure of their keen interest in their fire protection problem. The fire district when organized falls under the supervision of the county fire warden, who is also county forester. This official is directly responsible to his county board of supervisors.

Los Angeles County is the first to effect an extensive fire department organization, although many localities have taken advantage of the law to improve their fire protection facilities by the addition of motor equipment. Los Angeles County fire district has contracted for the purchase of ten American-LaFrance type-75 triple-combination pumping chemical and hose cars, made by the American-LaFrance Fire Engine Company, Inc., Elmira, N. Y. This design is particularly adapted for this type of fire fighting. The construction of the chassis with its chrome nickel steel frame and cross-members means rugged strength without excessive weight, while the simple and compact rotary gear pump gives high pumping capacity without undue bulk, so that the full power of the motor is utilized to carry the essential load rather than a massive chassis.

KEEP ROADS UP AND TAXES DOWN WITH

DOWFLAKE

CALCIUM CHLORIDE

"Road Maintenance by Dust Prevention" Costs Less

The rapid rise of highway engineering to a leading position among the larger industries has naturally attracted many of the foremost engineers to this work. These men have developed new methods worth using in country, village and city. Road maintenance by dust prevention with *Dowflake* is one of the most noteworthy developments in highway work.

From the time when a few tons of *Dowflake* was demonstrated to a county highway department until state departments began buying train loads, only a few years passed. Townships recommended *Dowflake* to adjoining townships. County officials vied with each other to build better roads—to make them last longer, and to make them more satisfactory to both residents and motorists. *Dowflake* fitted right into their plans for it kept roads better, made them last longer—it reduced maintenance costs to a surprising degree and made records for road officials.

When the road bed is in condition, an ordinary truck load of *Dowflake* driven over it at normal speed distributes *Dowflake* as it goes by means of a spreading attachment fastened to the rear of the truck. One man drives, another keeps the hopper full of *Dowflake*—when the truck has passed the job is done for months. Three men and two trucks will cover 20 miles in a day.

***Free Book:* "How To Maintain Roads"**

"How to Maintain Roads" is written especially for road builders. It is full of charts and diagrams, facts and figures that road men use in their work. It treats of the everyday problems a road man encounters and is really a summary of accepted methods practiced by the foremost engineers and maintenance men. Write for your copy and if you are interested in concrete work ask also for the book "How to Cure Concrete."

THE DOW CHEMICAL COMPANY

MIDLAND, MICH., U. S. A.

Branch Sales Offices:

90 West St., New York City — Second and Madison Sts., Saint Louis